

THE MINING CONGRESS JOURNAL

AUGUST, 1920

VOL. VI

No. 8

SAFETY-EFFICIENCY-CONSERVATION

IN THIS ISSUE:

Announcement: Twenty-second Annual Convention, The American Mining Congress, Denver, Col., November 15-19, 1920.

A digest of Mining and Petroleum News.

How the laws passed by the Sixty-sixth Congress are being administered, and what progress is being made under them.

Rulings of the Interstate Commerce Department.

A resume of what the public thinks on questions vital to the industry.

Monthly Financial Review.

Legal Decisions.

Patents.

PUBLISHED BY
THE AMERICAN MINING CONGRESS
PUBLICATION OFFICE
MUNSEY BUILDING **WASHINGTON, D. C.**

\$ 2.00 PER YEAR

20¢ PER COPY

Use the **EDISON STORAGE BATTERY**

Its strength and ruggedness will insure greater certainty in mine production. Use Edison Batteries

*in
Mine
Lamps*

The steel-and-iron construction of the Edison Battery gives great durability to the Edison Mine Lamp. It stands up in service. It gives ample, unfailing light. Successful use has made the Edison the Standard Electric Mine Lamp of America.

Ask for Bulletin 300-N



*in
Battery
Motors*

There's a big advantage in using the steel-and-iron Edison Battery. Then you can depend on your storage battery locomotives for steady, reliable service, day in and day out. You can depend on freedom from trouble. You can be assured of greatest production at lowest cost.

Bulletin 608-N on request

Edison Storage Battery Company
Factory and Main Office, Orange, N. J.

DISTRIBUTORS IN

New York
San Francisco
Philadelphia

Boston
Los Angeles
Scranton

Detroit
New Orleans
Pittsburgh

Chicago
Denver
Buffalo

Cleveland
Kansas City
New Haven

Seattle
Atlanta
Washington
St. Louis

General Distributors of Edison Mine Lamps: Mine Safety Appliances Co., Pittsburgh, Pa.

Rubber Goods for the Mining Industry



Giant Belt



48-10 Air Hose



Rainbow Steam Hose



Rainbow Packing

THE mining salesmen and the practical factory men of the United States Rubber Company are qualified, through study and experience, to recommend the right mechanical rubber goods for any condition existing in this industry.

They are ready to assist mine operators by advising as to the best application of mechanical rubber goods in order that the greatest possible service may be obtained for every dollar invested.

Take advantage of this Company's facilities and experience when in the market for mechanical rubber goods. Through our nearest Branch you can obtain the fullest co-operation of our organization.

United States Rubber Company

The World's Largest and Most Experienced Manufacturer of Mechanical Rubber Goods

BELTING

Transmission "Rainbow," "Pilot"

"Shawmut," "Giant Stitched"

Conveyor "United States," "Minister"

Elevator "Matchless," "Granite,"

"Granister,"

Tractor "Sawyer Canvas,"

"Little Giant Canvas."

Agricultural "Rainbow," "Bengal,"

"Grainster," "Sawyer Canvas"

HOSE

Air "4810," "Dexter"

Steam "Rainbow," "Giant Perfected"

Water "Rainbow," "Mogul," "Perfected"

Suction "Amazon," "Giant"

Garden "Rainbow," "Mogul," "Lakeside"

Also Hose for Acetylene, Oxygen, Acid,

Air Drill, Auto Radiator, Car Heating,

Air Compressor, Oil, Gasoline, Diesel,

Chemical, Coke, Creosote, Discharge,

Vacuum, Sand Blast, Spray, etc.

PACKINGS

Sheet "Rainbow," "Vanda," "Paramo"

Rod "Wizard," "Rainbesta," "Peerless,"

"Honest John," "No. 573,"

and hundreds of other styles
in coils, rings, gaskets and
diaphragms —

Uscos Valves —

THE RIGHT PACKING
IN THE RIGHT PLACE

MISCELLANEOUS

Mats, Matting and Flooring,

Plumbers' Specialties,

Rubber Covered Rolls,

Friction Tape, Splicing Comp'd.

Dredging Sleeves,

Hard Rubber Goods,

Printers' Blankets, Tubing,

Soles, Heels, Jar Rubbers,

Moulded Goods





CYANIDE

When You Need It

The mills operating on Aero Brand Cyanide in Mexico, Canada and the United States have never shut down from lack of cyanide.

The raw materials used in making Aero Brand Cyanide are obtainable in unfailing abundance—(1) Cyanamid—made at the same plant, for various purposes, at the rate of 72,000 tons per annum, and (2) Common salt—readily obtainable in the open market in unlimited amounts.

The process of manufacture is simplicity itself—merely fusing the raw materials together in a suitable furnace.

Aero Brand Cyanide, developed three years ago to meet an acute cyanide shortage and since used at the rate of thousands of tons per annum, has never missed shipment when wanted. Moreover, it has always sold, basis 100 per cent. NaCN, at prices practically equal to the lowest pre-war price of sodium cyanide.

Send for Booklet E, telling about this dependable, money-saving product.

AMERICAN CYANAMID COMPANY
511 FIFTH AVENUE NEW YORK

THE MINING CONGRESS JOURNAL

AUGUST

CONTENTS

1920

EDITORIALS

Appreciation.....	353
Verboten in Alaska.....	353
The Boomerang.....	354
The Open Market.....	354
Short Hours and Coal Prices.....	354
Non-Partisan Labor.....	355
The H. C. of L.....	355
Time to Stand Pat.....	356
Labor the New Capitalist.....	356
A Bad and a Good Example.....	357
The Union Label.....	357
England's Reserve Ratio and Ours.....	357
Standardization in Mining.....	358
Is He Radical?.....	359
The Government Machine.....	359
Co-operation in Tax Adjustments.....	361
Refunding National Debt.....	362
Financial Review.....	363
Announcement: Twenty-second Annual Convention.....	365

METALS, ORES, ETC.

Vanadium Development.....	378
Asbestos.....	378
Copper Outlook.....	379
Financing a Prospect.....	379
Mining in New Mexico.....	380
Mining Digest.....	378

COAL

St. Lawrence Rapids Power Development.....	366
Coal-Cleaning Plant, Alaska.....	369
Coal By-Products as Gasoline Substitutes	385

OIL

Oil — Over-Capitalization Cause of Failure.....	381
Possibilities in New Mexico.....	383
Oil Shale Development.....	384
Dr. Alderson's Investigation in Europe.....	384
Leasing Bill.....	368
Digest Mining and Petroleum News.....	378
GENERAL	
Alaska, Coal-Cleaning Plant.....	369
Asbestos.....	378
Digest—Mining and Petroleum.....	378
I. C. C. Decisions.....	390
I. C. C. Reports.....	390
Labor Legislation.....	369
Leasing Bill.....	368
Legislation.....	368
Mine Experiment Stations.....	369
Mining Digest.....	378
National Legislation.....	368
Oil Shale Development.....	384
Patents.....	361
Personals.....	392
Petroleum Digest.....	378
Press Control, German.....	387
Public Land Legislation.....	368
Public Opinion.....	372
Rice, George O., Takes Trip.....	367
Standardization Mining Equipment.....	358
St. Lawrence Rapids Power Development.....	366
Transportation.....	390
Water-Power.....	366
Water-Power Legislation.....	368
Women's Bureau, Labor Department.....	387

Entered as Second Class Matter January 30, 1915, at the Postoffice at Washington, D. C.

6726 KOPPERS COKE OVENS

IN OPERATION OR UNDER CONSTRUCTION
IN THE UNITED STATES AND CANADA
HAVE AN AGGREGATE ANNUAL
CARBONIZING CAPACITY OF MORE THAN

43,000,000 NET TONS OF COAL

Owner or Operator	Location	Number of Ovens
United States Steel Corporation		
Illinois Steel Company	Joliet, Ill.	280
Illinois Steel Company	Gary, Ind.	700
Tennessee Coal, Iron & R. R. Company	Fairfield, Ala.	434
Minnesota Steel Company	Duluth, Minn.	60
Carnegie Steel Company	Clairton, Pa.	768
American Steel & Wire Company	Cleveland, O.	180
National Tube Company	Lorain, O.	208
Woodward Iron Company	Woodward, Ala.	170
Coal Products Mfg. Company	Joliet, Ill.	35
Algoma Steel Corporation, Ltd.	Sault Ste. Marie, Ont.	110
Inland Steel Company	Indiana Harbor, Ind.	130
Republic Iron & Steel Company	Youngstown, O.	143
Bethlehem Steel Company	Sparrows Point, Md.	360
Bethlehem Steel Company	South Bethlehem, Pa.	424
Bethlehem Steel Company	Steelton, Pa.	60
Laclede Gas Light Company	St. Louis, Mo.	56
Cambridgeshire Steel Company	Johnstown, Pa.	82
Toledo Furnace Company	Toledo, O.	94
Youngstown Sheet & Tube Company	Youngstown, O.	306
LaBelle Iron Works	Follansbee, W. Va.	94
United Furnace Company	Canton, O.	47
River Furnace Company	Cleveland, O.	204
Brier Hill Steel Company	Youngstown, O.	84
Gulf States Steel Company	Gadsden, Ala.	37
Seaboard By-Product Coke Company	Jersey City, N. J.	165
Minnesota By-Product Coke Company	St. Paul, Minn.	65
Colorado Fuel & Iron Company	Pueblo, Colo.	120
Indiana Coke & Gas Company	Terre Haute, Ind.	30
Dominion Iron & Steel Company, Ltd.	Sydney, N. S.	180
Providence Gas Company	Providence, R. I.	40
Jones & Laughlin Steel Company	Pittsburgh, Pa.	300
Rainey-Wood Coke Company	Swedeland, Pa.	110
Birmingham Coke & By-Products Company	Birmingham, Ala.	50
Donner Union Coke Corporation	Buffalo, N. Y.	150
Domestic Coke Corporation	Fairmont, W. Va.	60
Pittsburgh Crucible Steel Company	Midland, Pa.	100
Chicago By-Product Coke Company	Chicago, Ill.	100
Milwaukee Coke & Gas Company	Milwaukee, Wis.	150

THE KOPPERS COMPANY

PITTSBURGH, PA.

BUILDERS OF BY-PRODUCT COKE PLANTS

CUT OUT FRIC^{TION} WITH HYATT ROLLER BEARINGS

Hyatt Roller Bearings provide a true rolling motion instead of the rubbing friction of plain bore wheels. Numerous tests have proven that a reduction of at least 50 per cent. in draw bar pull can be expected when Hyatt Roller Bearing equipped cars are used. Ask your regular car manufacturer for Hyatt equipped cars.

HYATT ROLLER BEARING CO.

Industrial Bearings Division

NEW YORK, N. Y.



D347

Better than a Whistle

That weird, penetrating screech of the Federal Electric Siren is loud and distinctive. It is far superior to the monotonous tone of a whistle and has replaced hundreds of them. Your men always hear it—it is never mistaken for any other signal. It gets them "on their toes" in a jiffy.



The Federal Electric Siren is quicker to reach and easier to operate than any other signal. Its maintenance cost

averages only \$2.00 a year. Push-button control may be located at any point or points in office or mine.

The largest and best managed mining companies in the United States use the Federal Siren.

Made in several sizes and models, so that the proper one can be selected for any requirement. Get a Federal Siren—the better signal for less money.

Send the coupon today for full information and prices.

FEDERAL ELECTRIC SIREN



SEND THIS COUPON TODAY

*Federal Electric Company, representing Federal Sign System (Electric),
8700 South State Street, Chicago.*

Please send full information regarding Federal Electric Siren. Our men live about _____ miles from the mines.

Name.....

Address.....

Company..... (MCJ-S)

LOCOMOTIVES

Twenty-eight loaded cars up a 2½ per cent grade. Total load about 112 tons, started and hauled.

VULCAN Hoists and VULCAN Locomotives have been helping mine both the coal and the ore of many countries for years.

VULCAN Hoists have the advantage of nearly seventy years of continuous development, and VULCAN Locomotives for use at coal mines have been built for more than forty years at Wilkes-Barre, Pa.

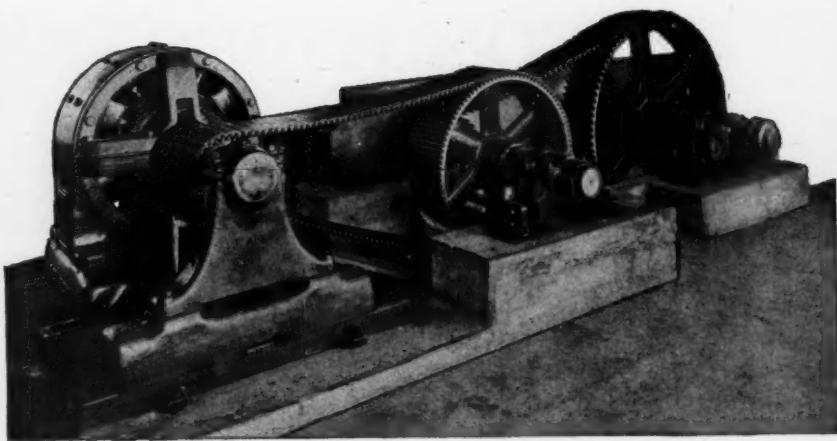
Some of the first hoists and first locomotives are still in regular daily service.

VULCAN IRON WORKS

Designers and Builders of Hoists and Locomotives

1736 MAIN STREET - WILKES-BARRE, PA.

HOISTS



Full Power

HEAVY DUTY ROLLING MILL DRIVE
REVERSES DIRECTIONS EVERY 45 SECONDS

Full Service

"Transmissions should be seen—Not HEARD"

MORSE Engineers believe in this so they designed the MORSE SILENT CHAIN DRIVE.

Study the principle of Morse silent chain drives and you will be convinced of their 99% efficiency.

Are you confronted with problems of Motor Drives with short centers or in Dust, Gases, Acid Fumes or Steam? MORSE drives are your solution.

Is the arrangement of your power peculiar? Write to MORSE engineers and let them extend to you their wide knowledge and experience with chain drives.

SEND YOUR TRANSMISSION PROBLEMS TO

MORSE CHAIN CO.

Ithaca, N. Y.

Largest Manufacturers of Silent Chains in the World

MORSE ENGINEERING SERVICE Address Nearest Office ASSISTANCE WITHOUT OBLIGATION

Boston, Mass.....	141 Milk St.	Canada.....	Jones & Glasco, Regis'd
Chicago, Ill....Merchants' L. & T. Bldg.		Montreal, St. Nicholas Bldg.	
Cleveland, Ohio.....	Engineers Bldg.	Toronto, Bank of Hamilton Bldg.	
Detroit, Mich.....1003 Woodward Ave.		Kansas City, Mo.....Finance Bldg.	
Greensboro, N. C.....805 Ashboro St.		Morse Engineering Co.	
New York.....50 Church St.		Minneapolis, Minn.....413 Third St. S.	
Pittsburgh, Pa.....Westinghouse Bldg.		Strong-Scott Mfg. Co.	
San Francisco, Cal....Monadnock Bldg.		St. Louis, Mo.....Chemical Bldg.	
Atlanta, Ga.....Chandler Bldg.		Morse Engineering Co.	
	Earl F. Scott, M. E.		



WRITE FOR FREE BOOKLET

1920 VEST POCKET MEMORANDUM AND DIARY IN PRESS

NORDBERG COMPRESSORS

have noteworthy features

Loading and unloading to accommodate the varying demand for air is accomplished gradually, hence the motor and the electrical system are not subjected to sudden load changes.

The air passing from low pressure to high pressure cylinder is cooled in transit by a very efficient inter-cooler.

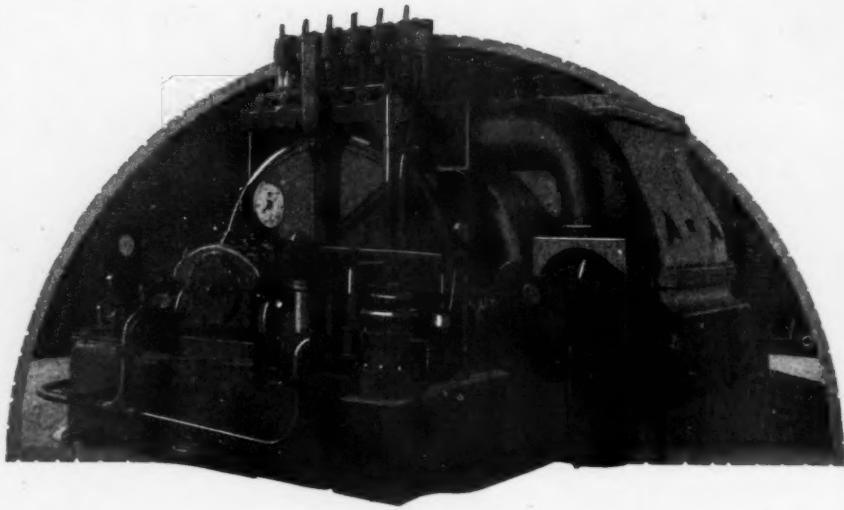
Direct connected motor drive combined with one horizontal and one vertical compressor cylinder reduce floor space requirements to a minimum.

All valves as well as the cylinders are completely water-jacketed.

Nordberg Compressors are daily continuing their economical performance in scores of mines and industrial plants where compressed air, hydrogen, and natural gas are required. For further information write

**Nordberg
Manufacturing
Company
MILWAUKEE, WIS.**





Turbo Blowers and Compressors

I-R Turbo Blowers range in capacity from 3000 to 60,000 cubic feet per minute, and pressures from 1 pound to 30 pounds. These units are built for use with Iron Blast Furnaces, Bessemer Steel Converters, Oil Furnaces, Copper Blast Furnaces and Converters, Copper Flotation; in fact, for all conditions where low-pressure air or gas is required.

Where high pressures are required, I-R Turbo Compressors are recommended. These machines are built for pressures up to 110 pounds.

Full Information on Request.

INGERSOLL-RAND COMPANY

11 Broadway, New York

Ingersoll-Rand

37-T

Westinghouse

Reducing the Handicap

The large quantity of water pumped or drained from coal mines in most mining localities has been the cause of consistent effort on the part of numerous pump and motor manufacturers to produce pumping apparatus of the highest efficiency.

Westinghouse Pump Motors

embody all the advantages of electric drive with an unusually high degree of reliability and economy. They have also demonstrated, to the satisfaction of every owner, their ability to operate continuously under the most adverse conditions.

Westinghouse Pump Motors are usually selected for service where continuous operation is imperative.

WESTINGHOUSE ELECTRIC & MFG. CO.
East Pittsburgh, Pa.



Progressive Industry quickly gives preference to the process which can show its advantages over other methods—the modern way is to do it electrically



Concentrated high
heat efficiency,
which immediately
fuses the metal, is
obtained by electric
arc welding



Stationary Arc Welding
Set is easily installed
for operation



Portable Arc Welding
Set permits of maxi-
mum use

Other G-E Industrial Heating Equipment:



Tilting Type Electric
Brass Melting Furnace—
2250 lbs. per hr.



Self-Regulating Bench
Type Electric Melting
Pot for metals—Bulle-
tin 69703



Electric Rivet Heater
is essential to quick
work well done—
Bulletin 69701



Electric Soldering Iron—
Production Helps in
Booklet B-3514

Utilize electric heat to the utmost

The essential value of electric heating equipment to modern industrial development is apparent in the large demand for various installations of this order to meet increased production schedules.

Slow and laborious processes which retard production must give way to units that employ electric heat—and one of the most essential of the improved methods is **electric arc welding**.

Electric arc welding maintains advantages in quantity, quality and cost—wherever iron or steel is to be joined in repair work, salvage, or original manufacture. The utilization of its possible applications extends over steel and iron works—boiler shops—foundries—repair shops—machine shops—and innumerable other industries.

An unusual simplicity and elasticity of operation has been perfected in the designs of Stationary and Portable Arc Welding Sets manufactured by the General Electric Company. This equipment can be provided for either group or single operator service, and generator can be driven by any source of power—engine, belt, d-c. or a-c motor. Send for Bulletin 49932-A.

To stimulate correct operation, the General Electric Company has established an Arc Welding School at Schenectady, which offers exceptional training in horizontal, vertical, and overhead welding under actual production conditions—free to a limited number of men. Bulletin No. 49953 sent on request.

General Electric Company

General Office
Schenectady, N.Y.

Sales Offices in
all large cities 438-403



**Over 300 Superior
McCully Gyratories
installed since 1909**

AND these machines are successfully operating on every grade of rock from soft limestone to trap rock and iron ore.

The success achieved by Superior McCully Gyratory Crusher is due to various reasons, chief among which are the suspended short shaft construction, force-feed lubrication and the freely tendered engineering and designing service which Worthington maintain at their Power and Mining Works, Cudahy, Wis. This service not only gives installation advice, but also dictates particular construction features which may be necessary to guarantee efficient, economical crusher service.

So when contemplating the installation of a crushing plant, be sure to avail yourself of Worthington advice and machinery. Both are standard.

Send for Bulletin P. M. 50

**WORTHINGTON PUMP AND MACHINERY
CORPORATION**

*Executive Offices: 115 Broadway, New York City
Branch Offices in 24 Large Cities*

Oiling System

"Superior" lubrication is force-feed by means of spur-gear oil pump under constant head of oil, positively delivering ample supply at all times to eccentric bearing and gearing. This force-feed cannot be compared with systems using plunger pump and check valves, which are often unreliable.

Other Worthington Products:

Gyratory Crushers, Jaw Crushers, Air Compressors, Mine Pumps, Revolving Stone Screens, Ball and Tube Mills.

PUMPS—COMPRESSORS—CONDENSERS—OIL & GAS ENGINES—METERS—MINING—ROCK CRUSHING & CEMENT MACHINERY

WORTHINGTON

Dense Works, Holyoke, Mass.
Bliss & Knobles Works
East Cambridge, Mass.
Worthington Works
Harrison, N. J.

Epping-Carpenter, Pittsburgh, Pa.

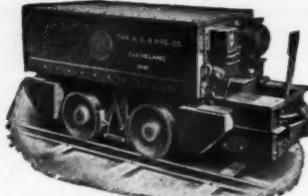
Laidlaw Works, Cincinnati, Ohio. Gas Engine Works, Cudahy, Wis.
Power & Mining Works
Cudahy, Wis.
Snow-Holly Works
Buffalo, N. Y.



**ATLAS
Storage Battery
Locomotives**

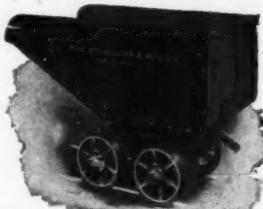
Atlas Storage Battery Locomotives are characterized by many exclusive improvements. These advantageous features, tested in hard service, have proved themselves invaluable. So, Atlas Locomotives are all that good locomotives should be.

The battery trays are removable. High-grade roller bearings are mounted in specially designed journal boxes, arranged for generous lubrication, easy in-



No. 5730
Standard Type B Storage Battery
Locomotive

This Locomotive is No. 5730 Standard Type C. It is ruggedly built. The parts are standardized, and are readily accessible, though extremely well protected. It is economical in operation and so simple that it can be operated by any available employee. Its practical construction makes it a reliable locomotive where dependable service is vital.



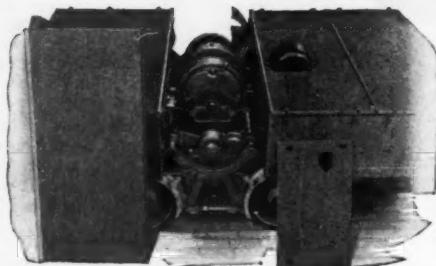
No. 261—Standard Scoop Car, rotary

THE ATLAS CAR AND MFG. CO.
ENGINEERS CLEVELAND, OHIO. MANUFACTURERS

**EVERY
Inch
Dependable**

spection and protection from dust and dirt. The axles are of a special grade refined steel. The controller has generous non-stubbing, copper contact tips and is designed especially for Storage Battery Locomotive service.

Sum up the features of an Atlas Locomotive and you have a haulage unit capable of delivering consistently satisfactory service.



Accessibility

Is an Important Feature of the

Ironton Locomotive

Investigate Ironton

Find out how they will reduce cost of gathering and increase tonnage in your mine.

Write for catalog. Tell us about conditions in your mine. Ask all the questions you want to.

You can get at the "works" in an Ironton as easily as a boy can get to the "insides" of his "Ingersol."

Just lift off the top and end covers, and nearly every working part that needs occasional inspection, lubrication or adjustment is easily accessible.

The design and construction of the Ironton is so simple and accessible that it is about as easy to give it proper attention as it is to neglect it.

THE IRONTON ENGINE CO., Main Office and Factory **IRONTON, OHIO**

BRANCH OFFICES:

Pittsburgh—584 Union Arcade Bldg.
Chicago—1330 Old Colony Bldg.
Denver—570 Gas & Electric Bldg.
Lexington, Ky.—1108 Fayette Nat'l

Philadelphia—1116 Fidelity Mutual Bldg.
Birmingham, Ala.—1308 American Trust Bldg.
Seattle, Wash.—Colman Bldg.
Huntington, W. Va.—1016 Robson-Pritchard
Bldg.

THE **IRONTON** STORAGE BATTERY LOCOMOTIVE

The World's Tonnage Record is held by "LONGLIFE"

A GOODRICH "LONGLIFE" Conveyor Belt installed at a Utah copper mine in the Spring of 1914 carried 7,313,400 tons of ore during a period of four years at a cost of less than twenty cents per thousand tons.

Never—to Goodrich's knowledge—has this achievement been approached, let alone equalled. Further comment seems superfluous in the face of such mighty testimony.

Why not dictate a letter to Goodrich asking them to send you their Belting Catalog? Surely it will have an economic message for you.

Goodrich "Longlife" Conveyor Belts

THE B. F. GOODRICH RUBBER COMPANY
Akron, Ohio

THE FIGHTING EAGLE OF AMERICA.



THE FIGHTING ORGANIZATION OF
THE MINING INDUSTRY

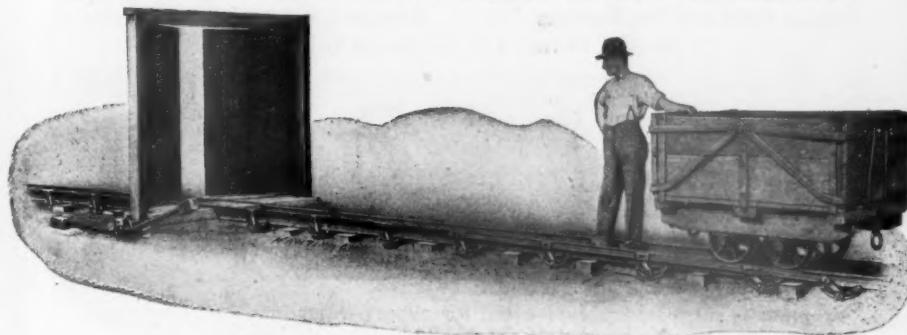
THE
AMERICAN MINING CONGRESS

Are YOU a Member?

ALWAYS AWAKE!

Dinwiddie Automatic Mine Door

THE ONLY MINE DOOR THAT OPENS FROM YOU



A Saver of Life, Money and Property

For Particulars Write

DINWIDDIE STEEL AND MANUFACTURING COMPANY
702 Fullerton Building ST. LOUIS, MO.

For Dependable Wire Rope Service



FOR heavy hoisting and haulage work and for use on steam shovels and mining machines, Hercules (Red Strand) Wire Rope gives dependable service because of its great strength, toughness and wear-resisting ability. Its use means safety and economy.

ESTABLISHED 1857

A. Leschen & Sons Rope Company
ST. LOUIS, MO.

New York

Chicago

Denver

San Francisco

New York Engineering Company

Specialists in Gold and Tin Placer Engineering and Equipment

Empire Gold and Tin Dredges

Empire Hand Prospecting Drills

Sluices, Riffles, Pipe Lines and Giants



Our plant is most favorably located for export shipments, being on tide-water at Yonkers, N. Y., and on the N. Y. Central Railroad.

New York Engineering Company

Office: 2 Rector St., N. Y.

Works: Yonkers, N. Y.

THE ROTARY CAR-DUMPER

At the Northwestern Mining & Exchange Company's
Granville Mine, Brockwayville, Pa.



Loaded Trip Ready to Enter Dump.

Dump Completed. Empty Cars below the Dump.

Saves from one-half to three-quarters the time usually required for dumping.
Reduces number of cars needed, as dumping is done rapidly, releasing cars quickly for reloading.

Enables use of more substantial solid-body cars, which last longer, require less repairs and prevent leakage of dust and coal along the haulage.

Saving of labor, saving of maintenance expense and increase of output, which means a larger production with same number of cars.

Tell us the type of your Mine and we will send some engineering data of interest and value to you.

CAR-DUMPER & EQUIPMENT CO.

Eastern Sales Office:
Union Arcade Building, Pittsburgh, Pa.

Main Office and Works:
Grand Crossing, Chicago, Ill. (47)



"The Waugh Way Wins"

Steel Stamina

THE EFFICIENCY of your drilling operations depends to a great extent upon the "stamina" of your drill steel.

THE "STAMINA" of your drill steel depends not only upon the quality of the steel, but also largely upon the way it is forged.

SUCCESSFUL SHARPENING depends wholly upon your blacksmith shop being equipped with a sharpener that will always strike true, sharp blows and thus produce the correct shape and preserve the uniformity of the steel structure.

THERE IS ONLY ONE BEST—the Model 8 Waugh Drill Sharpener. Ask your blacksmith. He knows *the Waugh Way Wins*.

THE Denver Rock Drill Manufacturing Co.

DENVER, COLORADO

Melbourne
Johannesburg
New York City
San Francisco

Lima
Santiago
Mexico City
Los Angeles

Salt Lake City
Birmingham
Seattle
Joplin

Scranton
Butte
Houghton
Wallace

El Paso

CANADIAN ROCK DRILL COMPANY, LIMITED

Sole Agents in Canada

Toronto, Ont.

Cobalt, Ont.

Nelson, B. C.

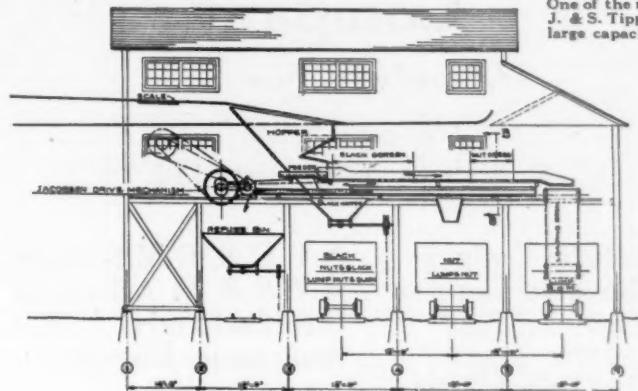
Vancouver, B. C.

L-8

JACOBSEN

The Simplified Tipple

For Most Satisfactory Screening Preparation and Loading of Clean Coal



Write today for descriptive bulletin "G"

JACOBSEN & SCHRAEDER, Inc.
ENGINEERS AND CONSTRUCTORS

Majestic Bldg., Chicago

Oliver Bldg., Pittsburgh, Pa.

ANACONDA COPPER MINING CO.

ROLLING MILLS DEPARTMENT

Manufacturers of all commercial sizes of hot rolled

COPPER RODS

Bare Copper Wire, Strand, Trolley
Wire, Telephone and Telegraph Wire

All operations from the mining of the ore to the finished
product are under our direct supervision and management.

GENERAL OFFICE:
CHICAGO, ILL.

MILLS:
GREAT FALLS, MONTANA

United Metals Selling Company

42 Broadway, New York

European Agents:

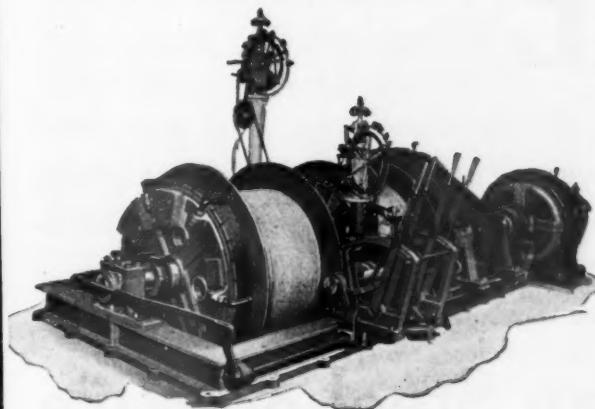
C. S. Henry & Company, Ltd.
12 Leadenhall St., London, E. C.

Electrolytic Copper
Best Selected Copper
Pig Lead—Dealiverized Common
and Corrodng
Electrolytic Zinc
Highest Grade and Purity

N E C & B M Brands
A B S & M A Brands
International (I. L. R. Co.)
Anaconda Electric

*Selenium, Arsenic, Nickel Salts, Tellurium
Copper Sulphate*

LIDGERWOOD HOISTS



Steam—Electric

For every type of
MINE SERVICE

Designed and Built
to give the

Strength
Capacity
Economy

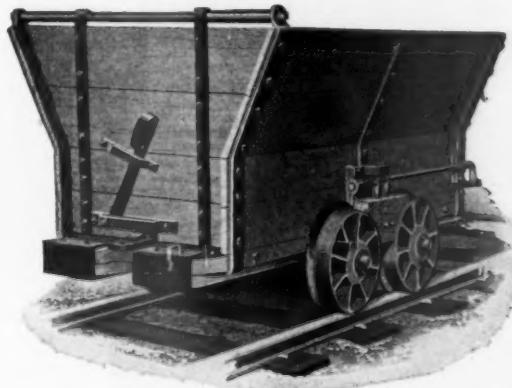
that is essential to success
in mine haulage

Catalogs on Request

LIDGERWOOD MFG. COMPANY

96 Liberty Street, New York

Philadelphia Pittsburgh Cleveland Chicago Detroit Charleston, W. Va. Seattle Los Angeles London, England



No. 434-M

WATT CARS

If you are contemplating the purchase of cars, we suggest your writing for our illustrated catalogue. You will find it helpful and interesting toward making a selection of the type of car best suited for your operation. We will do the rest without waste of time as soon as you decide on placing your order with us.

CARS—THAT'S ALL WE MAKE

The Watt Mining Car Wheel Company

BARNESVILLE, OHIO

DENVER OFFICE:

Lindrooth, Shubert & Co., Boston Building

SAN FRANCISCO OFFICE:

N. D. Phelps, Sheldon Building

PHILADELPHIA OFFICE:

Edelen & Co., 235 Commercial Trust Building

WIRE

electrical, rope; airplane, piano,
pipe-organ, flat wire (strip steel)
hoops, bale-ties, tacks, nails,
barbed wire, concrete rein-
forcement, springs, netting, wire fences, steel posts, steel
gates, trolley wire and rail bonds, wire wheels, auto-towing
cables, horse shoes, round and odd-shape wires for manu-
facturing.

Illustrated books describing uses, FREE

American Steel & Wire Company

Chicago—New York

GNS FLOTATION OILS

Many mills continue using the oil mixture merely suggested in the preliminary tests; others have found more efficient ones by making practical mill runs on oils that have given the best results on similar ores.

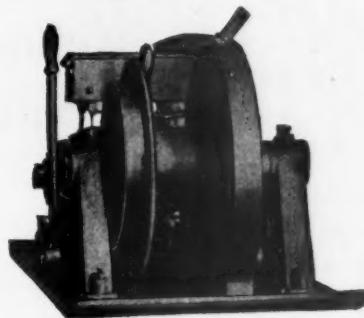
Our line is very complete and includes some new oils recently developed.

**PURE PINE OILS, Steam and Destructively Distilled,
COAL TAR and HARDWOOD CREOSOTES**

GENERAL NAVAL STORES COMPANY
90 WEST STREET, NEW YORK

Pneumelectric
TRADE MARK

For
Handling
Cars
Any
Place



Made in
Single
and
Double
Drum

5-Horsepower Electric Hoist.

Specially adapted for use in and about the mines.

We also manufacture electrically operated Rock Drills, Coal Punchers, and Gathering Pumps.

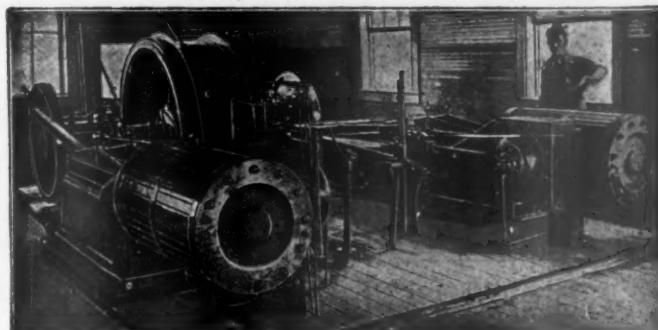
Full information furnished on request.

THE PNEUMELECTRIC MACHINE COMPANY
SYRACUSE, N. Y.

ROBT. HOLMES & BROS., Inc.

Successors to DANVILLE FOUNDRY & MACHINE CO.

Corner North and Hazel Streets, Danville, Ill.



MANUFACTURERS OF

Danville Hoisting and Haulage Engines, both Light and Heavy Duty Type, first and second motion.

Halbert's Patent Self Dumping Cages.

Holmes' Patent Weigh Hopper.

Plain Cages.

Holmes' Automatic Car Lifts for mine bottoms.

Holmes' Shaker Screen.

Iron, Bronze and Brass Castings of all description.

Holmes' Telescoping End Loader.

Heavy Iron and Steel Forgings.

All kinds of Plate Metal Work, particularly for coal mines.

SERVICES

Bituminous Coal Mine
Engineering
MINE SURVEYING
Topographical, Under-
ground, Valuation and
Technical Reports
TIPPLES, Steel and Wood
DESIGNING OF
Mine Buildings, Power
Plants and
Industrial Housing.
Municipal and Private
Water and Sewage
Systems
Mechanical, Electrical
Equipment and Machine
Designing, Hydraulics.

SERVICES

Designing of Steel,
Reinforced Concrete and
Timber Structures.
Bridges, Roadways and
Land Drainage.
Commercial, Factory and
School Buildings.

Heating and Ventilation
of Buildings.
Churches, Residences,
Apartment Houses,
Hospitals and Industrial
Housing.
Landscape Designing,
Parks, Boulevards and
Private Estates.



For Service and—

*satisfaction, you want the ability, reliability and
responsibility of a master technical organization
whose scope includes Engineering, Architecture
and the many other departments of the
SHOURDS-STONER CO.*

Formerly SHOURD-McCORMICK CO.

Terre Haute, Ind.

Manufacturers of

"National" Brands Safety Fuse

For use in all mining, quarry
and agricultural blasting

THE
**NATIONAL FUSE & POWDER
COMPANY**

Office and Factory
DENVER COLORADO

"EXPLOSIVES"

Gold Medal Dynamite

**Black Diamond
Permissibles**

**ALL GRADES TO FILL EVERY
REQUIREMENT**

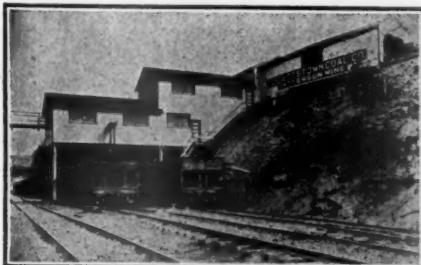
BLASTING SUPPLIES

Illinois Powder Mfg. Co.

1548-51 PIERCE BUILDING • • ST. LOUIS

Works: Grafton, Illinois

Branch Offices: Chicago, Memphis, Kansas City
And Many Other Distributing Points



Marcus Patent Coal Tipple



ENGINEERS AND CONTRACTORS FOR

Complete Coal Mining Plants
Marcus Patent Picking Table
Screen
Coal Re-screening Plants
"Rands" Shaker Loading Booms
Locomotive Coaling Stations

Coal Washing Plants
Coal Storage Plants
Coal Mine Power Plants
Sand Drying Plants
Rotary Dumps
Coal Tipplers

ROBERTS AND SCHAEFER CO.

ENGINEERS AND CONTRACTORS
CHICAGO, U.S.A.

General Offices, McCormick Building

Allis-Chalmers Manufacturing Co.



Allis-Chalmers machinery forms the major part of the equipment of very many large milling plants; it is reliable because it is "built for service."

Milwaukee

Wisconsin

Sales Offices in Principal Cities

Jimmie Lomax is an Old-time Machine Runner

He has run mining machines for years—but not Goodman machines.

He simply *knew* there was no machine to equal the one he had always run.

He could hardly be persuaded to look at the Goodman machine that came into his mine a few weeks ago.

He is a good fellow, though, as well as a good machine man, so he consented to help out the boss "until a Goodman man could be secured."

He therefore ran the new machine part time, for the little cutting required in its new territory.

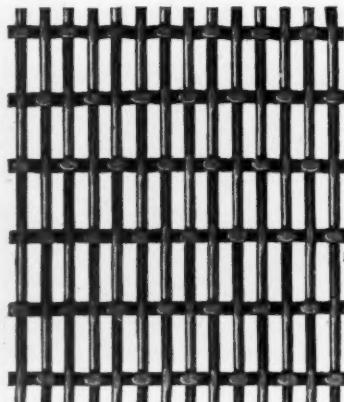
Now he is reluctant to leave *his* Goodman and return to his first love for even part time work. And when a new man is secured, that new man will have to take the old machine or Jimmie will have something forceful to say.

**Jimmie is just like many another who has been won over to the Goodman
Shortwall Machine by a few days of pleasant experience with it.**

GOODMAN MANUFACTURING COMPANY

48th to 49th Streets, on Halsted
CHICAGO, ILLINOIS

(86)



Whatever your requirements or preferences in wire screening, you can get the best of its kind from the Ludlow-Saylor Line.

Write for our Catalogue, FREE

ECONOMY UNIFORMITY CAPACITY

The three watchwords of screening efficiency. Rapid production of uniform screenings, over a long period of time, in Jigs, Trommels, Chileans and other types of crushing and grinding mills, such as the "Rek-Tang" Screen delivers, means a large saving every day in your mill operation.

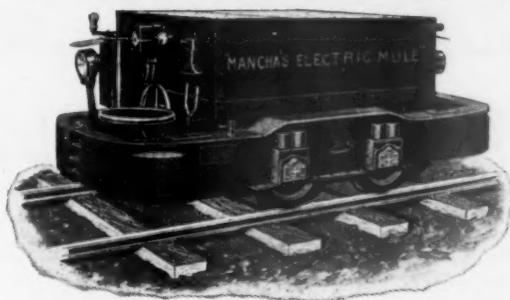
"Rek-Tang" Rolled Slot Screen has greater capacity per unit of area, greater strength to withstand weight and greater lasting ability than any other screen.

*"If better screen cloth were possible,
Ludlow-Saylor would weave it."*

**THE LUDLOW-SAYLOR WIRE CO.
ST. LOUIS, MO.**

THE MANCHA ELECTRIC MULE

SATISFACTION
in mechanical
haulage de-
pends upon re-
liability first;
second, upon
capacity, and
third upon
CONVENIENCE.



THESE
features have
been carefully
provided for in

MANCHA
STORAGE
BATTERY
LOCOMOTIVES

Mancha Storage Battery Locomotive Co. ST. LOUIS, MO., U. S. A.

Branch Offices:

C. B. GOODWIN, - - - Huntington, W. Va.
EDW. H. GIBBES, Mgr., 609 Chamber of Commerce
Bldg., Pittsburgh, Pa.

EASTERN SALES MANAGER, Frank J. Foley, Grand Central Palace, New York

Representatives:

JOS. B. NOROS & CO., - - - Scranton, Pa.
THE HENDRIE & BOLTHOFF MFG. & SUPPLY CO.,
Denver, Colorado.
POWLEY & TOWNSLEY, - - - Toronto, Canada

**WRITE FOR
YOUR COPY**



It tells how to reduce
the cost of wear and tear,
how to reduce the cost of Lubri-
cation and just which grade of
Superla Grease is the right
one for your particular
mine car equipment.

STANDARD OIL COMPANY
(INDIANA)
CHICAGO, ILLINOIS.

Pumps, Pipe and Fittings of Hard Rubber

The safe method of conveying corrosive liquids is through *hard rubber* installations. Hard rubber is not affected by concentrated hydrochloric acid, hydrofluoric acid, caustic soda, copper sulphate, sulphuric acid (up to 50° Baume), nitric acid (up to 16° Baume) and practically all other acids, alkalis, cyanides, etc.

That means low upkeep expense and uncontaminated solutions.

Mining, Smelting and Chemical industries are beginning to realize that there is no satisfactory substitute for hard rubber Pumps, Pipe, Fittings and Utensils.

Write for circular and information, telling us about your individual problem. Let our experts work with your chemists.

American Hard Rubber Co.

16 Mercer Street, New York, U. S. A.

Factories: Akron, O.; Butler, N. J.; College Point, N. Y.

MYERS-WHALEY SHOVELING MACHINES WILL SAVE YOU MEN AND MONEY



Results prove that Myers-Whaley Shoveling Machines accomplish a saving of 50 per cent of the cost of hand mucking, in the actual loading operation.

Is your present output sufficiently large? If so, by employing *Myers-Whaley* Shovels you will require less labor and a smaller development; with the attending advantages of less track outlay, simplified ventilation, etc. But the crying need of the time is *increased production*. You can double your production, without increasing your development or labor supply, by using the *Myers-Whaley*.

Machines are made to suit any track gauge and are equipped for any commercial current or for compressed air.

Bring us your loading problems.

Myers-Whaley Company
Knoxville, Tenn., U. S. A.



The superiority of design and construction of Allis-Chalmers Rotary Kilns makes them particularly dependable for nodulizing blast furnace dust, and crumbly iron ores which are otherwise unsuitable for injection into blast furnaces. Our kilns are also well suited for roasting and heat treating ores of iron, copper, zinc and mercury, and Allis-Chalmers dryers and coolers form a most suitable adjunct to the Rotary Kiln equipment.

Write for Bulletin No. 1457-A.

ALLIS-CHALMERS
Milwaukee, Wis., U. S. A.

THE OTTUMWA LOADER

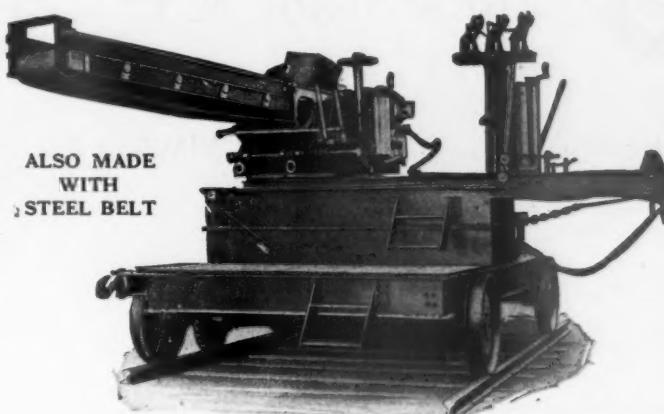
There is No Better on the Market

YOUR BEST INVESTMENT

Our loader will give you satisfaction, also help you increase your tonnage and at the same time greatly reduce your loading costs

THINK THIS OVER

E
F
F
I
C
I
E
N
T



E
C
O
N
O
M
I
C
A
L

OTTUMWA PORTABLE RUBBER BELT CONVEYOR BOX CAR LOADER

YOU CAN SEE AT A GLANCE

This machine is a wonderful labor saver

JUST THE MACHINE YOU HAVE BEEN LOOKING FOR

Orders are coming fast, and for this reason your order should be placed at once to get delivery for your Fall and Winter use.

Write Us Today for More Information

MANUFACTURERS

OTTUMWA BOX CAR LOADER COMPANY, OTTUMWA, IOWA.

BEST BOX CAR LOADERS
AND
UNLOADERS

The Roessler & Hasslacher Chemical Company



709-717 Sixth Avenue
NEW YORK, N. Y.



WORKS:

PERTH AMBOY, N. J.

NIAGARA FALLS, N. Y.

ST. ALBANS, W. VA.

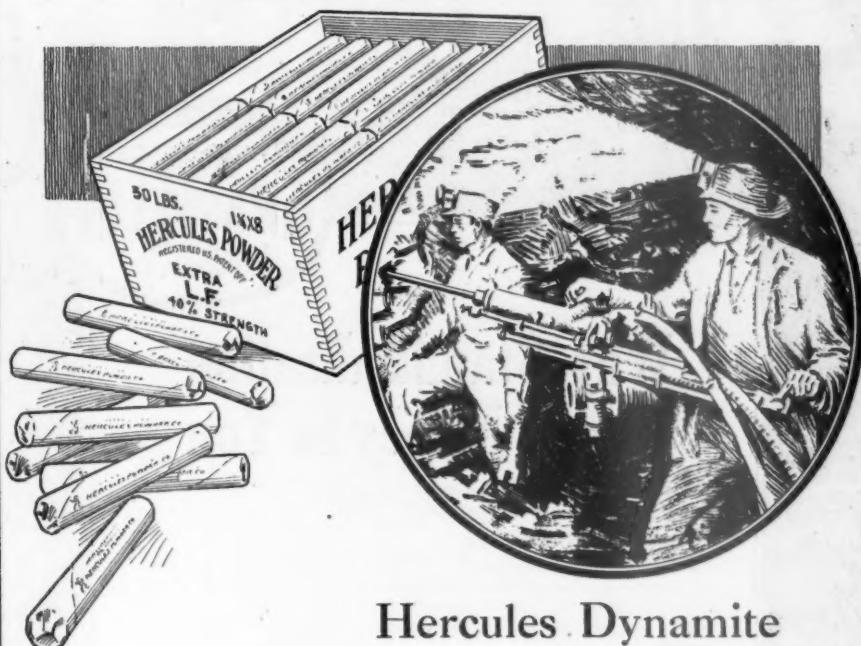


CYANIDE OF SODIUM 96-98%

Cyanogen contents 51-52%

“CYANEgg”

or Cyanide of Sodium 96-98% in egg form,
each egg weighing approximately one ounce.



Hercules Dynamite in the Metal Mines

Wherever explosives may be used in your mine
Hercules Powders will get results.

The best evidence that miners are profiting by the use of these powders is the fact that hundreds of car loads of Hercules Dynamite go into the metal mines every year.

With the help of these explosives miners are getting out millions of tons of ore and getting it out quickly and efficiently. In fact Hercules Explosives are a very important factor in the present large production of metal ores in every mining field of the United States.

Use Hercules Dynamite in your mine. Their high and uniform quality will help you to increase production and cut costs.

HERCULES POWDER CO.



Chicago
Pittsburg, Kan.
San Francisco
Chattanooga

St. Louis
Denver
Salt Lake City
Pittsburgh, Pa.

New York
Haileton, Pa.
Joplin
Wilmington, Del.



**HERCULES
DYNAMITE**



CHEMICALS
SPILLER
GRASSELLI
COLORS
EXPLOSIVES

Why Standardization Means Money to You

The Grasselli Powder Company could produce a score of different permissible powders—but they don't.

Instead They Standardize

For years every resource in laboratory and factory has been utilized in producing three powders that would accurately and economically meet all the conditions of the various coal fields east of the Mississippi. The increasing success of those three powders,

CAMERON 1-A MINEITE 5-D MINEITE 6-D

has proven that they do embody all the qualities necessary to blast your coal more efficiently, at lower cost and in the shape you desire it.

Through this system of standardization we have been able to incorporate in those powders the highest quality ingredients and still market them without increasing the price to the consumer.

THE GRASSELLI POWDER COMPANY CLEVELAND, OHIO



Explosives

for every blasting
requirement



for

Road Building
Excavating
Ore Mining
Coal Mining
Quarrying
Demolition
Agriculture

Atlas Explosives are manufactured with specific characteristics for different classes of work. The various Atlas brands differ in strength, quickness, sensitiveness, resistance to cold, fumes involved on detonation and resistance to water, according to the requirements of the work for which the explosive is to be used. The qualities most needed in one class of work may be worthless or actually derogatory in another.

To insure Atlas users getting the best results with the greatest economy of time, labor and money, we maintain the Atlas Service Division. Here is a corps of experts who are thoroughly conversant with the exact properties of every explosive and the most efficient methods of using them.

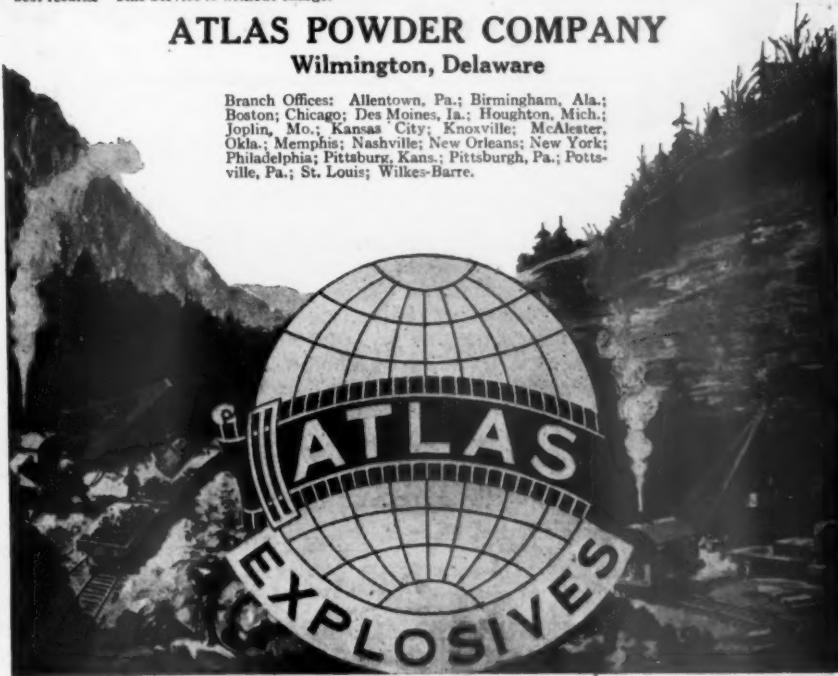
When you are in doubt on any question pertaining to explosives write and explain your troubles to our Service Division. They will give you the correct solution to your problem and, if necessary, will send a specialist to determine just what methods you should use to get the best results. This Service is without charge.

More than 100 Different Kinds

Dynamite
Permissible Explosives
Gelatin Dynamite
Blasting Gelatin
Extra Dynamite
Oil Well Explosive
Quarry Powder
Farm Powder
Low Powders
Blasting Powders
Sporting Powders
Blasting Supplies

ATLAS POWDER COMPANY Wilmington, Delaware

Branch Offices: Allentown, Pa.; Birmingham, Ala.; Boston; Chicago; Des Moines, Ia.; Houghton, Mich.; Joplin, Mo.; Kansas City; Knoxville; McAlester, Okla.; Memphis; Nashville; New Orleans; New York; Philadelphia; Pittsburgh, Kans.; Pittsburgh, Pa.; Pottsville, Pa.; St. Louis; Wilkes-Barre.



comfort is Capital

Work is work; Mining is mining. When you've done everything you can, you can't get away from the discomforts of mining. But—

You **can** give your miners dry clothes to work in—sanitary, well-ventilated street clothes to go home in.

Close, stuffy, musty, ill-smelling clothes-lockers are incubators for disease germs.

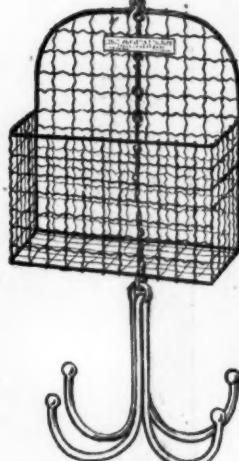
Pure air and plenty of it, up at the washhouse ceiling where the air is warmest—an ample basket for the miner's lunch and personal effects—a strong chain and trusty padlock for safety—that's the modern, sanitary way, exactly as the law requires.

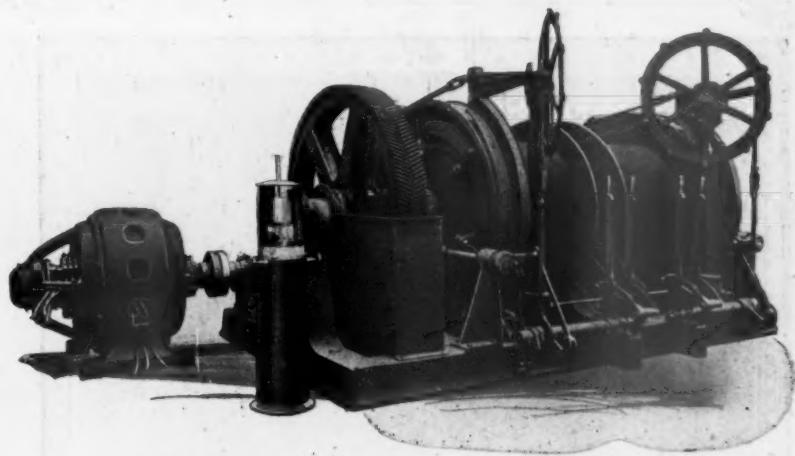
Hang your men's clothes **High and Dry** with the **Union Sanitary Clothes Hanger**, cheapest and best.

Our new booklet, "High and Dry," free on request.

JAMES H. CHANNON MFG. COMPANY
227-9 West Erie Street

Chicago, Illinois





W-S-M Double Drum High Type Hoist

This illustration shows a W-S-M standard self-contained single reduction hoist. The herringbone gears are completely enclosed and operated in oil. The hoist has flexible coupling ring oiling pinion shaft bearings, dial indicators, hand operated clutches and post brakes. Hoists of this type are made in standard sizes varying from one of 2500 pounds capacity at 300 feet per minute, with a drum of 24 inches diameter and 24 inches face, to one of 6500 pounds capacity at 800 feet per minute, with a drum of 48 inches diameter and 36 inches face.

**The Wellman-Seaver-Morgan Co.
Cleveland, Ohio**



STEPHENS-ADAMSON MFG. CO. AURORA ILL.



S-A UNIT CARRIER "A WINNER"

They Win Your Confidence

The dependable service characteristic of all Unit Carriers has won for them the everlasting confidence of users.

Freedom from breakdowns, their ease of operation, the low upkeep costs and the power saving—these points should influence every purchaser of belt conveyor equipment to specify S-A UNIT CARRIERS.

Unit Carriers are now recognized by operators in the many fields of industry as the most advanced type of carrier manufactured. The operating expense has been found to be below that of any other carrier on the market. This fact is true primarily because they run without constant lubrication and require only occasional inspection.

The Unit Carrier is of all-steel construction, which speaks for itself of durability.

We earnestly recommend that Unit Carriers be specified on all belt conveyors.

QUOTATIONS ON REQUEST
Stephens-Adamson Mfg. Co.
Aurora, Illinois

Our engineers are glad to demonstrate the economies involved in the use of Unit Carriers.

THE MINING CONGRESS JOURNAL

Official Publication of the American Mining Congress

APPRECIATION

During the past several months, as a result of the activities of The American Mining Congress, a great deal of public discussion has been given to the existing danger with regard to the possibility of a failure of the monetary gold reserve. Conventions have been held and addresses made to many commercial and bankers' associations, but one of the finest and most appreciated publicity efforts of the entire campaign up to the present time was the publication by the San Francisco *Chronicle* of two full pages explaining in detail the gold situation and the necessity for protecting the gold reserves of the nation at this time. This publication was made during the early days of the Democratic Convention, and the editor of the *Chronicle* openly appealed to the Democratic platform makers to add a plank pledging that party to the protection of the gold reserve and the encouragement of the gold producers.

VERBOTEN IN ALASKA

Often in the pages of this Journal we have protested against the policy of extreme, radical conservation, a conservation which would have us indefinitely preserve our natural resources without development for the benefit of posterity.

Arnold Bennett says: "The thought of posterity leaves me quite cold." We cannot but feel that he is right to a great extent. Our forefathers may have had posterity well in mind in the adjustment of their political problems, but it is also true that they adjusted them to meet the

exigencies of the then situation. A great deal of editorial paper has been wasted in bemoaning the loss of certain early resources, as, for example, the black walnut timber. Granting that it all could have remained standing until now, its present value could not have been an infinitesimal portion of the value of the cleared land which was surrounded by the sturdy fences of black walnut so "wasted" and the countless dollars which have been taken out of that same land in crops and produce. Similarly we have had a school of conservationists who would have reserved all the water-power of the nation. They reserved thousands and thousands of acres of Western land for oil development for the use of the Navy. Not a foot of drilling has ever been done on this oil land by the Government. It is as foolish to conserve water-power resources by not using them as it would be to pass a law against the use of wind for windmills. Natural economic laws have a way of producing, prior to the exhaustion of a necessary resource, another which replaces it to even greater advantage.

On this subject the *New York Times*, in justly commanding Secretary of the Interior Payne for his attitude on Alaska, says:

"Mr. Payne, the Secretary of the Interior, puts his finger on the sore spot of Alaska.

"There are too many things 'reserved.' One almost thinks of 'verboten' in Germany. Conservation in the States is most desirable, but what Alaska needs is more men and women and less governmental regulations.

"Never was a truer word spoken of that region of unbounded resources and potentialities. From the best of motives Alaska has been overconserved and constricted. Her de-

velopment has been fettered lest somebody should get rich in the process. Not thus did the great States of the West grow up. They almost paid a bounty on energy. A free field and free play; and let the pioneer become a 'plutocrat' if he could. They prospered because they invited an active and ambitious population; Alaska has been for years the most beruled, belawed, beregulated of countries. Wealth immense, population scanty, development arrested or straggling. Such is the result of fanatical 'conservation.' Wasn't it Drysdale, in 'Tom Brown at Oxford,' who explained, when caught, in a vinous moment, burying the college plate, that he was 'providing for posterity'?"

THE BOOMERANG

Just how the arguments of "labor leaders" strike the man who is made to suffer direct loss as an indirect result of the Heaven-born right of the union to strike is something worth considering. Of course, we all know how the 85 per cent. feel about it; but when men absolutely uninterested in a quarrel developed between two groups operating in another field of endeavor are forced to face idleness for themselves and short food and fuel supplies for their families, there must be some hesitancy about believing the brave speeches upon which the Federation of Labor is building its "strength." An interesting illustration of what happens under this divine-right rule is found in the iron regions of the North, where, as a direct result of the bituminous strike with the consequent disorganization of the railroad and steamboat systems, iron-ore movements have been reduced to the minimum and coal importation is so slow that thousands of miners will be laid off, possibly for months. The effect will be general and the season is now so far advanced that no amount of Government control or co-operation between transportation lines can change the ultimate result. Mines without coal means miners without work and without coal for domestic use. Miners without work means poverty and physical suffering. Miners without work means lowering production, and lowering production means slowing down of steel production, which means slowing down of building and other constructive industries. This,

in turn, means less work and less wages and more uncertainty and new fields ripe for sedition.

No wonder, then, that Big Bill Haywood expresses his pleasure at the adoption of the slogan "Divine Right to Strike," for it has a sweet sound to a seditious and does his work as well or better than he could do it for himself.

The loss of the profits upon 15,000,000 tons of iron ore not moved this year is not to be compared with the loss to men and industry at a time when men need more work and more money rather than less of both. Mr. Gompers nullifies his own arguments in the minds of thinking laboring men when he says that the divine right to strike supersedes the God-given right of every man to protect himself and his family from want.

THE OPEN MARKET

Nobody kicked about the "open market" when silver made an altitude record, but when the tailspin began there were loud cries of "Pittman Bill," and the open-market idea lost popularity. Ray Baker, Director of the Mint, was able to make prompt and effective use of that hackneyed old expression, "I told you so," and he had. Some silver men had said rough things about The American Mining Congress for helping to fix the price of silver at \$1 per ounce, but the Pittman Act made a good cover when the market broke.

SHORT HOURS AND COAL PRICES

The National Coal Association has issued a very instructive chart, showing the increase in the cost of producing coal, which result from the short working hours caused by the lack of cars to transport the coal and otherwise.

The public has never before so thoroughly appreciated the fact that coal cannot be stored at the mine, and that coal cars must be available to take it immediately from the mine in order that mining operation may proceed.

The chart referred to shows that if the basic 45-hour week is reduced to a 12-hour week, the cost of production is more than doubled. In other words, it shows that the overhead expense, which must be continually met, is such that continuous production is necessary to insure a reasonably low price for coal. While this is equally true in other lines of business in which it is necessary to operate full time in order to accomplish the cheapest production, it is particularly true with reference to all mining operations, in which the cost of maintenance and upkeep is greater because of the rapid depreciation of mining property.

The chart enforces a striking lesson which it would be well for the public to thoroughly consider. A large number of mines during the last few months have only been able to operate from three to six days per month because of the shortage of cars with which to transport the coal to market. The mine which operates only six days per month must necessarily get a double price for its coal, while the mine operating but three days per month must receive approximately two and one-half times a normal price for its output. The coal-using public should better appreciate this situation and be more willing to lend its assistance to plans by which continuous operation of coal mines may be made possible.

NON-PARTISAN LABOR

The so-called National Labor Party, a distinctly radical wing of the labor movement in America, has seen fit to publicly announce itself as a part of the "Third Party." A circular has been issued by Samuel Gompers, Joseph Valentine, William Green and Matthew Woll in behalf of the American Federation of Labor, summarizing the conclusions of the Federation as to both Republican and Democratic platforms and making comparison with the political demands made by labor. The summary thus published indicates that in the minds of these leaders the Democratic platform seems most "progressive." The Federation, how-

ever, wishes to stand upon the pronouncement contained in the following two paragraphs which close the official analysis:

"The men and women of labor of the United States and her liberty-loving people must judge between the declarations of these parties. The impending campaign and election for President and Vice-President, United States Senators and members of the House of Representatives is upon us, and the citizenship of our country must determine its own course in electing those candidates for freedom, democracy and humanity, and to defeat those who are less friendly or more hostile to these principles."

"Labor of America is not partisan to any political party; it is partisan to principles, the principles of justice and freedom. It undertakes neither to dictate nor control the choice of the workers or the citizenship generally for which party or candidates they should vote, but it would be a palpable dereliction of duty did we fail to place the facts before the voters of our country upon the records of both parties and their respective candidates for public office."

Regardless of all the blunders of the American Federation of Labor, and regardless of the failure of Mr. Gompers and his associates to realize that the right of the public are paramount to the rights of organized labor, it is very evident that what has been believed by thinking business men to be true is here established.

When Mr. Gompers in an unguarded moment allowed himself to utter the pronouncement that the right to strike (no matter what the cost to the nation in starvation, financial loss, disruption and corruption) was the paramount issue and the premier right, Mr. Gompers went a long way toward fixing the status of the American Federation of Labor, and this classification will have to stand.

THE H. C. OF L.

Interpreted in the ordinary acceptance of the recently adopted American phrase, the above headline would indicate that this editorial was for the purpose of discussing the high cost of living. For once, however, the reader is mistaken. A grand jury impaneled by the County Judge at Cleveland, O., has completed

an exhaustive study of the industrial situation, and reports to Justice Kennedy of Cleveland that today it requires twice as long with the same number of men to erect a house as it did in pre-war times. Five years ago 100 carpenters accomplished as much as 200 accomplish today. Bricklayers do not even reach the 50 per cent. efficiency mark, and the same is true of paperhangers, painters and plasterers. Wages have been increased in some cases 200 per cent. General labor costs have increased 400 per cent. The report indicates that there is very little pride in the quality of service performed, and that rentals of dwelling-houses cannot be lowered under the present costs for labor and supplies.

Inasmuch as this jury was composed of free-born citizens, sworn to an official duty with the power of research not possible to any except under an order of court, it is presumed that the findings of the jury are based upon hard and fast facts which may be interesting for labor agitators to read as a matter of self-education.*

Taken in conjunction with statements just issued by the Department of Labor, with its well-known tendency to favor union labor, the report of the Cleveland jury is doubly interesting. The Department shows that there were 3314 strikes in 1919, affecting 4,112,507 workers, who lost more than twice as much time as was lost in 1918, or, in fact, during any previous year.

Considering the marked increase in wages over previous years, therefore, the loss to labor alone in the matter of wages was not only twice as much as, but probably 75 per cent. higher than has ever before been known in a single year. To the innocent bystander who suffers from the conditions thus arbitrarily imposed upon him without his consent, although not without his knowledge, the average man begins to wonder whether it would not be a good idea for the thinking laboring men of the United States to give a little collective consideration as to whether or not the H. C. of living is not affected by the H. C. of strikes.

TIME TO STAND PAT

Isn't it about time that all employers took the stand taken by the silver producers and business men of the little mining camp of Neihart, Mont.?

The miners were getting \$5.50 per day. The I. W. W. sent in its agitators, organized the men and demanded \$6 per day and recognition of the I. W. W. "Big Union." Employers refused to deal with the I. W. W. and declared that the camp would remain shut down until the I. W. W. eliminated itself. The merchants of the town organized and refused credit to members of the I. W. W. The 500 miners in the camp and several leasers had to lose out and the operators forced themselves to look at the situation calmly and wait. However, the men enjoyed their Heaven-born rights and struck. It is not understood that the women and children were called upon to vote on the strike question.

LABOR THE NEW CAPITALIST *

The Railroad Brotherhoods plan to create a bank primarily to serve their membership, but ultimately to engage in general banking business in Cleveland, capitalizing this bank from their membership fund and large reserve which they have built up from it.

This is a vastly different proposition than for the railroad workers to storm the Government with demands that the roads be turned over to them; that a minimum wage be guaranteed, and that losses be assumed by the Government, as the railroad workers would have us do under the Plumb Plan. For this differs from the Plumb Plan in that the worker's own money is invested in his own enterprise instead of Government funds invested in an enterprise to be run for the benefit of the workers and whose losses for inefficiency are to be absorbed by the Government.

The International Garment Workers' Union will undertake to establish union factories and retail stores in an effort to provide steady work for union members, and with the hope of reducing the prices

of clothing. For this enterprise they have at least one-half million dollars capital, ample for its conduct. There is nothing revolutionary in this; there is nothing Bolshevikistic, Communistic or Socialistic. This is but a development on a large scale appropriate to modern business conditions of a basic truth in American economic life, namely, that every laborer is a potential capitalist. It is the kind of enterprise that every thoughtful person would like to see labor engage in. It involves financial responsibility. The difficulty with labor up until now has been that it has insisted on power without responsibility.

A BAD AND A GOOD EXAMPLE

No business organization has a right to invoke the law of supply and demand as a justification for high prices in times of stress and then interfere with the law of supply and demand by cutting off the supply in times of plenty to prevent price reduction.

The American Woolen Co. has based selling prices on replacement costs for four years. Now, when replacement costs for wool are lower than they have been for years, the woolen mills are closed down, thus shutting off supply to keep demand in line with exorbitant prices.

A marked contrast with this policy is shown by the United States Steel Corporation, which has held its prices at the levels established by the war boards—much below the present market prices—and has thereby an immense volume of future orders on its books. The relative wisdom of these two courses of action is apparent. Good-will is a tremendous asset.

THE UNION LABEL

Out in one section of California it is necessary to die and be buried by the union route. This has been decided by Local Union 262 of the United Brotherhood of Carpenters and Joiners of America at San Jose, Cal. Official proposal

for an amendment to the national constitution of the brotherhood just adopted by the San Jose organization reads as follows:

"No member, legal heirs or wife's legal heirs will be entitled to funeral donation unless the deceased is buried in a coffin or casket bearing the label of the United Carpenters and Joiners of America."

Publicity to the above California item was given by United States Senator N. B. Dial of South Carolina, when he, in a public address, quoted the action of the San Jose union a few days since.

There will now be an order, an injunction or something of this sort, to be issued by the unions against the taking of medicine not made by members of the Medicine Makers' Union from cows, rattlesnakes or vegetation under a sun operated under the eight-hour rule, with double pay for overtime.

It may be that the San Jose resolution will not carry beyond the confines of the California town, but it expresses the mental attitude of labor radicals and indicates a tendency which might easily be taken most seriously.

Carrying this theory to its natural conclusion, it might some day be necessary for a man to call a union doctor for himself or his family, secure a union permit to die and force his friends to hire a union embalmer who would use union-made embalming fluid and charge double time for his services between 5 P. M. and 8 A. M. The suggestions contained herein are just about as sensible as the suggestion of the San Jose Carpenters, but "it might be done."

ENGLAND'S RESERVE RATIO AND OURS

Amateur economists, especially those desiring further credit inflation rather than an increase of our gold reserve, have attacked the necessary requirements of our Federal Reserve Bank system of 40 per cent. reserve ratio to liabilities. They have based this attack on the statement and showing of the Bank of England, which furnishes the same

reservoir of credit for the British Empire as the Federal Reserve system does for this country.

When the English bank's ratio declined from 15.42 per cent. to 8.49 per cent. in the week ending June 30 these attacks were renewed with great vigor, our anti-gold economists saying, in short: "Look at Great Britain, the remarkable financial position she maintains; yet she finds it necessary to maintain only a reserve ratio of 8.49 per cent., when we are hampered by a requirement of 40 per cent. What, forsooth, is a reserve for unless it is to be used?"

The first and most obvious argument against this statement is the fact that once a reserve has been used it is no longer a reserve. The Federal Reserve system furnishes a final reservoir of assets which are basic for the entire credit structure of our nation. Let this reservoir be emptied and there is no such reserve. An expended reserve or a distributed reserve is no longer a reserve; it simply ceases to exist.

The second argument against this position is based upon the difference between the methods of computing the reserve ratio in the United States and in Great Britain. The methods of computation are totally different; the basic figures are taken from different sources, and the resultant ratios are of different significance and hence not comparable.

The Bank of England is divided into two departments—the banking department and the issue department. In the issue department is maintained the balance between notes issued and assets applicable against them. These assets always represent 100 per cent. cover for the issued notes. These assets are made up of Government securities and gold. The first item is relatively small, the gold going to make up approximately 90 per cent. of the cover for the issued notes. It is in the banking department alone that their reserve ratio is calculated.

The Bank of England's reserve ratio is calculated on the basis of the ratio between the Bank of England notes on hand in the banking department plus the

gold and silver on hand as opposed to deposit liabilities.

Our Federal Reserve ratio represents the ratio of total cash reserves, gold, silver and legals, as opposed to the combined deposit liabilities and Federal Reserve note liabilities of the banks.

On June 30, therefore, the Bank of England's ratio of reserve to deposit liabilities in the banking department only, which is the way it is calculated there, was 7.89 per cent. But on the same day if to this be added the figures of the issue department and the ratio calculated as we calculate it the ratio of metallic reserve to deposit and note liabilities combined is shown to be 37.81 per cent.

England has long recognized the strategic importance of gold, and never overlooks that importance for a moment. We can well take lesson therefrom, and by increasing our gold production strengthen our credit position.

STANDARDIZATION IN MINING

Charles A. Mitke, chairman of the Metal Division of the American Mining Congress Committee on Standardization of Mining Equipment, has completed a very interesting series of articles, illustrated by charts and drawings, which have been published in the *Engineering and Mining Journal* of various States. These articles have been compiled in book form and issued by the McGraw-Hill Book Co. of New York. There has been some discussion among metal-mining operators as to the practicability of a national standardization movement in behalf of the equipment and methods in metalliferous mining. Operators known for their business sagacity and success as managers have stated recently that to attempt to standardize methods and equipment in metalliferous mines was to attempt the impossible, owing to the widely varying conditions to be found in various States and localities. Disagreement with this attitude is expressed tersely and convincingly in the preface of Mr. Mitke's book, in which he says:

"Great economies in any business of production result from careful and thoughtful attention to details, and mining is no exception to this rule. On the contrary, successful mining is one of the greatest embodiments of the principle. The difference between the careful manager and the careless one is apt to be the difference between profit and loss."

And it is upon this business principle involved that The American Mining Congress is just completing the organization of a concrete national Standardization Committee, a section of which is devoted to the problems connected directly with coal production and another section to the problems connected with metalliferous and petroleum mining. We believe that The Mining Congress has taken up a movement which will bring great credit upon The American Mining Congress, the beneficial effects of which will be felt for all time in the mining industry.

IS HE A RADICAL?

During the International Labor Convention at Montreal last June, the radical wing of the Federation of Labor held a special private conference in the Place Vigor Hotel of that city. The chairman of the conference was Max Hayes of Cleveland, and the principal speaker of the evening was a Mr. Duncan of Seattle, whose name is connected with unsavory history as to labor movements and radicals in more than one section of the country. Mr. Duncan made a very (for him) normal radical speech, requiring considerable revolutionary language. He condemned the Federation of Labor and appealed generally to the rank and file of labor to strike against the Federation of Labor. A Mr. Harroll of the Machinists' Union also popularized himself by a few revolutionary remarks. He also made a very interesting statement—that is, it interested Mr. Harroll, and if generally believed would interest the employers of labor throughout the continent. He claimed to know that President Gompers of the Federation of Labor was a radical, and was certain that the revolutionary plan would appeal to Mr. Gompers. Mr. Harroll made a very clever suggestion, which was that

for the present the radical wing content itself by securing the election of one or more members on the Executive Committee of the American Federation of Labor.

Whether or not Mr. Harroll was correct as to his measure of Mr. Gompers, he was correct as to the cleverness of the method by which the American Federation of Labor can be broken down in morale, and the recent activities of the Federation of Labor indicate that both Mr. Duncan and Mr. Harroll may have been stating openly some things which as members of the inner ring they might already recognize as a partly established fact.

The results of the Federation meeting—called in Canada for the purpose of conducting a house-cleaning in the United States—are a proof that the borers from within are the real menace to the American Federation of Labor. The fact that the I. W. W. and the radical branch of the Federation of Labor are both working for the one Great Cause—the "one big union"—indicates, whether Mr. Gompers and the Labor Hierarchy are pleased with the prospect or not, that there is a dove-tailing of ideas, ideals and plans which will probably ultimately overwhelm the present type of labor leaders and seat such men as Duncan, Harroll, Big Bill Haywood and other choice representatives in the labor movement.

THE GOVERNMENT MACHINE

The New York *Evening Post* has published an interesting and illuminating series of articles by Z. L. Potter, a staff correspondent, whose opportunity for close observation of Government affairs in Washington has peculiarly fitted him for such a task. This campaign on the part of a great newspaper, following the introduction of special legislation looking to the reorganization of the administrative machinery of the Government, is indicative of a rapidly broadening vision on the part of newspaper men who live under the shadow of the Capitol, and whose observations can be credited with

being as nearly non-partisan and unbiased as may be possible to find. Mr. Potter has taken the various phases of administrative developments carefully and chronologically, and has evidently given a great deal of thought to the problems and the solutions which will afford the best results. One significant expression used by Mr. Potter in explaining the difficulties facing those who attempt to reconstruct the administrative policies of the nation's business is contained in the following paragraph, he having first proposed that there be a general readjustment of the salaries not only of executives, but of the specially trained men who must be employed in all departments:

"Can the taxpayers of the United States afford to have a \$10,000-a-year man planning the expenditures of \$7,000,000,000 of their money if a \$25,000-a-year man is available to do so? We shall never get more capable administration of the Government than the capabilities of the men we hire to run it."

The *New York Post*, however, has assumed that Government officials are receiving salaries of \$10,000 a year, while as a matter of fact such salaries are only paid to a very few. The rule is that these scientific men receive less than \$4000 per year, and many high-grade men are working for less than \$3000. The directors of the governmental bureaus receive \$6000. It is not necessary to pay \$25,000 per year, but it is extremely important that highly trained technical men shall receive salaries which cover the necessary cost of living.

Theoretically, every employe is supposed to do, and it becomes his duty to give, the very best service which he can without reference to the salary paid therefor. Practically, however, the incentives which make for the highest efficiency are glaringly absent.

The business men of the United States who have watched with growing concern the failure of the Federal Government to realize the appalling growth of inefficiency in Government administration

will say "Amen" to this suggestion of the *New York Post*, realizing as they do that business conditions of today demand that not only business but the Government must recognize the necessity for readjustment of the salaries paid to all responsible workers, whether they be of the lower ranks or the men who plan and administer the business of corporations or the Government.

Those closely in touch with internal administrative affairs are well aware of the fact that one of the greatest difficulties facing the Government since the signing of the armistice has been the impossibility of holding in line the skilled and trained Government officials and subofficials necessary for the accomplishment of the rapidly increasing administrative duties. Business everywhere is crying for more men and greater efficiency. The Government has been a great business training school, which during the past 18 months has been drained wherever possible to furnish a supply of trained men for responsible positions. This should not be so, as the business of the Government is beyond question the most important business to be performed in behalf of the nation. No one can blame the trained administrative officer for leaving an underpaid position when a salary two or three times as great is offered him elsewhere.

A frequent contact with scientific men, heads of departments, subheads and those responsible for important subdivisions of Government administration develops the fact that these men who are giving their lives to Government service have been obliged to struggle through the high-cost-of-living period with scarcely no consideration of a serious nature on the part of the Government, while as against that stands an almost startling extravagance practiced and allowed to be practiced in other forms of Government expenditures.

Efficiency in Government administration can never be obtained while Congress follows the present miserly and inconsiderate policy in the employment of its responsible administrative officers and workers.

CO-OPERATION IN TAX ADJUSTMENTS

The American Mining Congress has been actively engaged in service looking to the proper and just application of income tax laws to the mining industry since the year 1913, when the first Federal law was enacted under full constitutional authority.

The Revenue Act of 1913 recognized the theory and equitable practice of depletion, or return of capital by depletion as differentiated from income or profits, although the annual net allowance therefor was limited to 5 per cent. of gross value of the minerals produced. This deduction was manifestly inadequate in the great majority of cases, but the principle, in its result, was not so important with the then relatively low rate of taxation.

The American Mining Congress immediately began a campaign of education to acquaint Congress with the gross injustice of the 5 per cent. limitation. As a result, the 1916 Act carried a far more acceptable provision, which eliminated the percentage restriction and granted a "reasonable allowance," not to exceed the market value of the product removed during the taxable year. The full benefit of this all-important substitution was not realized until 1917, when the income tax rates were raised to an unprecedented level and the hybrid excess profits tax had its now famous inception.

Except for the relief afforded by allowances for depletion, the Revenue Acts of 1917 and 1918 would have placed upon mining operations a burden so great as to have made active continuance virtually impossible. A tax law which fails to identify the peculiarly hazardous and wasting nature of the development and conversion of natural resources confounds all the equities of the so-called "faculty" tax, the tax that is founded on the fair principle of "ability to pay."

The flat-rate income tax is a good tax, relatively. Despite its inherent faults and administrative difficulties, it has withstood for years the many economic

and political buffettings to which it has been subjected not only in the United States, but throughout the world. While it had its real origin in England more than 100 years ago, it is now distinctly an American institution, and is generally accepted as the fairest means of distributing a large part of the burden of supporting government.

The income tax has come to stay, and is practically certain to apply in its present form to the year 1920. That strange device, the excess profits tax, will also be with us for the present year, but it will either be abolished by Congress or so thoroughly revised when made applicable to 1921 as to be relieved almost completely of its present torments. A tax which, apart from its fundamental anomalies, does not lend itself even to a minor degree of administrative practicability cannot long endure in the United States. It more than served its purpose in the sudden emergency, but now must go.

Notwithstanding the lapse of time and the heavy assessments that have been made and paid, the taxes for 1917 are still largely unsettled and many taxpayers are still worried over their final commitments for that year.

Multiplying the difficulty of these one-year adjustments by at least four, we find a mountain of individual and general problems which must be solved by taxpayers before the Treasury Department, problems that, unless the rapidity of settlement experienced in the past can be greatly accelerated, will prove cumulatively harassing, if not economically vicious, for many years to come and invite a constant flow of litigation.

The American Mining Congress, mindful of these enormous difficulties, has established a Tax Division under the direction of a capable and experienced specialist. Assistance will be lent to the taxpayers, or their representatives, when presenting their cases before the authorities in Washington, and through the dissemination of important current information and otherwise the Tax Division will extend its full facilities and services

in the attempt to be of benefit both to the taxpayer and the Bureau of Internal Revenue.

REFUNDING NATIONAL DEBT

It has been recently estimated that some \$5,000,000,000 of war paper still remains as a frozen credit in the hands of the banks of the country. This represents the various forms of war paper that were placed upon the market but have not yet been actually sold. The retention of such a large volume of undigested war paper in the banks is thus consuming some 50 per cent. of the normal potential banking resources of the nation. It is obvious that the first orderly step in any plan which contemplates a contraction of the credit and currency structure depends upon the liquidation of this frozen credit. The reason may well be asked why this war paper has remained since the armistice in the hands of the banks, and a satisfactory reply must take into account that the war paper itself has not measured up to other investments in the competitive bond market. This fact, coupled with the extensive decline in the principal price of Liberty bonds of the various issues, is sufficient evidence for the conclusion that the interest rates provided in the bonds were artificially low.

The Treasury Department has purchased since the armistice over \$1,000,000,000 of war paper at the market price; has computed the amount of gain that this has provided the Government, and has cited the transaction as an operating efficiency. At what expense has the Treasury Department made the profit? At the expense of every patriotic citizen of the United States who purchased the Liberty bonds with every assurance of the Four-Minute Men speaking in behalf of the Government that the face value of the bond would always be realizable, and that the buyer would in no way be forced to assume a loss. The transaction involves the integrity of the Government to make good its promises to its citizens.

While the Government may not have

realized at the time the bonds were being sold that the interest rate was so artificially low as to compel ultimately the reduction of the principal of the bond, it must be realized now, as the facts have already developed. The first obligation of a person in a private transaction with another would be to make good the discrepancy at whatever cost in order that the business integrity of that person might be maintained. This would be regarded in a private transaction as the first consideration, and there can be no line drawn between what is honest in a private transaction and a Government transaction, as the credit possibilities of both depend upon the complete fulfillment of their obligations. In such a case the Government might well consider refunding the entire national debt in the form of bonds exchangeable for those now held, but carrying an honest interest rate. Competent financiers are of the belief that that interest rate would not greatly exceed 5 per cent. in order that the principal of the bonds would be maintained at par. If this were done, the investments in the Government war paper would be on an attractively competitive basis, and the war paper now so greatly congesting the banking system of the country would be rapidly removed. A prerequisite to such a refunding operation would be a stipulation that the holders of present war paper would have a period of three months in which to exchange their present holdings for bonds of the new issue.

It is becoming more evident also that the time period written in the present outstanding bonds is so short as to burden the country's resources during this period of industrial readjustment and recuperation. The time period might well be extended to cover 50 years. A sinking fund should be provided from the earnings of the Government to provide for the retirement of the principal of such an issue.

Upon the elimination of the war paper from the banks of the United States a tremendous increase in the banking resources of the country would be made immediately available for the expansion

of those industries upon which the prosperity of the country depends, especially in the production of essentials and living necessities. The need for further inflation would have completely disappeared, and an orderly process of deflation could be put in operation without in any way interfering with the normal industrial expansion of the country. The country's earning capacity would be greatly increased because of a resultant increase in the physical volume of its natural resources, and with that increased earning power the war debt could be much more rapidly retired.

Under present conditions there is not sufficient capital available to satisfy the requirements of industrial expansion in the country, as is evidenced by the fact that the physical output of resources during 1919 was less than any year since 1916. The present limitation imposed upon the availability of the banking resources of the nation, if allowed to continue, can result only in a continued reduction in the physical output of our resources, which will be reflected in a declining national earning power, thereby postponing the repayment of the public debt.

FINANCIAL REVIEW OF THE MONTH

The promised advancing market which was to follow the political conventions arrived the week following the Democratic nomination, but for a movement which had been predicted and anticipated for more than two months it was a very weak showing, indeed. Prices had gradually worked higher in anticipation of a stronger bull move than actually took place, so that the bulge, which occupied just one week, covered a very narrow range, carrying U. S. Steel up to 95 and Baldwin up to 127. The rails have had a steady advance, which has been somewhat at cross-current with the general market trend.

This advance is due to the advance in railroad rates which has been anticipated from the Interstate Commerce Commission. These advanced rates, announced July 31, amounting to a billion and a half

dollars, will go a long way toward rehabilitating the railroads. If the railroad stocks score any further heavy advances because of these increased rates, the industrial stocks cannot be expected to follow them the whole way, for it is the industrials that will pay the increased freights; granting, however, that these new rates will speedily help railroad service, the ultimate benefit to industrials will be in excess of the cost in freight rates.

Following this bull move the market turned soft, and declines of from 1 to 2 points daily set in with scarcely any visible rally until the market was carried, in a great many cases, to the new lows for the year, U. S. Steel on July 28 touching 87½. The report of the Steel Corporation received a mixed reception, those who were interested in the bear side of the market receiving it with disfavor. We cannot but feel, however, that with transportation and fuel conditions as they have been for the past three months, the company's showing of business and of future orders is exceptionally good. Pig-iron production for the month of June was at a rate of 5000 tons per day in excess of the May output. Although this shows increasing operation of steel plants, there is a large amount of finished products accumulating in storage yards because of inadequate transportation conditions.

Those who look for much increased activity in the market for the coming six months should bear in mind that the month of June was the lightest business for that month since 1914. The motor stocks, particularly General Motors, have been very weak. General Motors touched a new low at 20¼. Willys-Overland is one of the few which has held up. This is primarily because during its strike last winter a great many of the adverse conditions which are now confronting other manufacturers were discounted in the market price of Willys-Overland stock during February and March.

The tire and rubber stocks have followed the Motors down, U. S. Rubber making one new low after another.

The petroleum stocks, which have

scored substantial gains in the face of the new and favorable governmental conditions in Mexico, declined in harmony with the general market, so that all of these gains were lost and they registered their lows of April and May.

In the long liquidating process of a market which is dependent on strained credit conditions which must endure over a period of many months, it is apparent that in one stock after another all the speculative values will be squeezed out. That is what is happening in the present market. First one stock will register a new low and then another. There will be a time between now and the forward movement, which will set in around the first of the year, when the whole list will be discounted and well bought. It is apparent that the bottom of the present decline has not been reached, however.

It is a favorite practice of brokers to tell their clients of the liquidating value of certain stock; a stock, for example, having a market price of \$95 to \$100 a share is quoted as having assets behind it of \$250 to \$300. In making such predictions it should always be remembered that such liquidating value is dependent on the opportunity for liquidation. If general conditions arise which would make such a liquidation necessary, it is obvious that the opportunity for it would be gone. Such information is a dangerous criterion on which to buy stock. A stock is worth what you pay for it the day you buy it on the market, and the next day it is worth what it is quoted on the boards. Any values due to reserve assets which are well enough known to be a matter of public comment by brokers or by market reports are well enough known by the people who make it their business to buy valuable stock that it is no safe basis on which to make purchases. For those who fear panics, however, it is refreshing to remember that the same brokers who are now telling us of the panic conditions which have followed periods of inflation are the same brokers who a year ago were telling us of the period of extreme prosperity which always followed the destruction created by any great war. It is appar-

ent that we are to have neither of these conditions. Neither will there be huge prosperity, nor will there be the danger of panic. It is impossible to have a sustained bull market in stocks in the face of a steadily declining commodity market. The steadily declining commodity market is the thing the country needs now, and it is getting it even in the face of serious coal shortages and transportation tie-ups.

There was talk no longer than six or eight months ago that there would be an actual shortage of foodstuffs in this country and overseas this coming winter. Our present wheat crop, together with the fact that more than one-third of last year's wheat is still in storage in the elevators and bins, added to the largest corn crop in the history of the world, is reassuring in the face of any absurd statement of dangers of actual want or privation because of lack of sufficient foodstuffs.

Since trading in wheat has been resumed, the price has declined until it is now, for the first time in years, around \$2. Breadstuffs will be both plentiful and cheap during the coming year.

The Treasury Department issued its semi-annual statement for the period ending June 30, 1920. This shows a reduction in the public debt of \$2,250,000,000, more than half of this contraction having been made in Treasury certificates.

As the Government will come into the market for more loans based on these Treasury certificates within the next two months, some of this gain or reduction will be lost. However, the showing is substantial and encouraging for general conditions. The total debt of the United States now stands at \$24,299,000,000.

The same financial advisers who during the declining market of May told us that the Federal Reserve Bank's statement was to be interpreted unfavorably, in that it was no better, during the slight advancing market, in July told us that the Federal Reserve Bank's statement was to be interpreted favorably, in that it was no worse.

When we are inclined to listen to financial advisers who tell us that the prices

of stocks are now scraping bottom, we must remember that our credit resources are also scraping bottom, and will continue to scrape bottom until after the crop movements of the fall, and probably until after the fall elections.

The market is both lower and quieter, and it is apparent that further breaks are not only possible but probable. Any large volume of business is bound to be on the downward scale rather than upward until our process of liquidation is more nearly complete, until European politics are less threatening and until our transportation system can ship a larger percentage of our necessary volume of business.

CONSTRUCTIVE PROGRAM

Plans are being completed for the 23d annual convention of the American Mining Congress in Denver in November. The program now under consideration will be based upon the political and industrial developments of the past few months, and correspondence received by the American Mining Congress from many leading engineers and producers indicates that already great interest attaches to the outline of the proposed activities.

Although no exposition has been publicly announced in connection with the Denver convention, letters are already being received by the American Mining Congress from exhibitors who participated in the St. Louis convention, requesting space at Denver. The fact that there will be only about 7000 feet of available exhibit space has led the officers of the congress to place the matter of an exposition before a special committee now being organized under the direction of Chairmen Roberts and Mitke of the Standardization Committee, and it is expected that the exhibits arranged for will be limited to those of

an educational or scientific character. There may be some exhibits of highly specialized products, and possibly some mining exhibits from Colorado and other States.

It would be impossible at this time to announce the Denver program, but all of the tentative plans thus far developed will be placed before a special advisory program committee, composed of five representatives of the industry, who, in co-operation with the officers of the congress, will suggest the advisability of adopting or discarding the various plans now up for consideration. This committee will be announced next month, and will, we believe, be an assurance that the Denver convention will work up a concrete and constructive standard in behalf of the mining industry such as has never before been attempted. Convention headquarters will be opened in the Albany Hotel, Denver, Col., about August 10, at which time John T. Burns, Assistant Secretary of the American Mining Congress, will locate in Denver, from which point he will travel throughout the West during the promotion of the Denver meeting. Convention communications should be addressed to Mr. Burns at the Denver office.

When the workmen own the workshops;
And the railroad men the rails;
And the grocery clerks the groceries;
And the mail clerks own the mails—
When the preachers own the pulpits;
And the pressmen own the shops;
And the drillers own the oil wells;
And the jails are owned by cops—
When the conductors own the street cars
And each driver owns his bus;
Will you tell us common people—
Whatinell becomes of us?

—Santa Fe "New Mexican."

ST. LAWRENCE RAPIDS POWER DEVELOPMENT

Construction of an international water route from the Great Lakes through the St. Lawrence River to the sea, with attendant development of 6,070,000 theoretical electric horse-power, is being considered by the program committee for discussion at the forthcoming 23d annual convention of The American Mining Congress at Denver. The effect of such development on the nation's coal supply, which at the time of the project's completion will be a subject certainly no less absorbing than it is now, makes the topic one of commanding importance to mine operators, mining engineers and holders of mining securities.

The St. Lawrence Rapids interpose themselves as the only considerable barrier to ocean-going vessels between Lake Ontario and Montreal. Along this stretch of 46 miles of the international border it is proposed to construct a series of locks and power dams which will make Superior, Chicago, Detroit, Duluth, Cleveland, Buffalo and Erie ocean ports and release energy equal to from 10 to 15 per cent. of the total present horse-power development of the United States. Since America will be half owner of the water route and of the hydro-electric power developed, all parts of the country are vitally interested in the proposal.

There is no question as to the feasibility of the project. Engineers are agreed as to that. Even the subject of cost offers little opportunity for debate, for the amount can be closely approximated and it is known not to be prohibitive. There are just two questions to be answered: "Is it needed?" and "Will any one part of the country profit at the expense of the other?" And these two questions have been asked, and must be answered, with respect both to the transportation and the power development aspects of the project. Members of The American Mining Congress are interested in both phases.

Wheat, meat and dairy products, copper, zinc, lead and iron ore, automobiles, rubber goods and innumerable other products of the West, Northwest and North would go either in raw or manufactured form from convenient Lake ports to all parts of the world without transfer, hence more quickly and economically than they do now. But the railroads would lose a tonnage to which they have long been accustomed and the port of New York would suffer to like extent. As against these disadvantages, it will be claimed that the railroads have more business than they can handle and that New York would gain immeasurably as the exporting point for new factories which would be established and existing plants which would increase their capacity because of the comparatively cheap

and never-failing hydro-electric power which would become available. These are the main transportation phases of the question.

But those who go to Denver will be interested primarily in the possibilities of the waterway as they relate to the development of hydro-electric energy. And they will have some interesting figures to study. The fall of the St. Lawrence from Lake Ontario to Montreal is 222 feet at low water. The variation between maximum and minimum flow is scarcely 25 per cent. and the mean annual flow is approximately 241,000 cubic feet per second. The theoretical amount of energy available is 6,070,000 horse-power. If because of losses in head and inefficiencies of generating equipment only 70 per cent. of this energy can be made available, there would then be 4,250,000 horse-power for commercial utilization. Most of this power would go to New York State and New England, but the power of Niagara now consumed in New York would be released for Pennsylvania, and coal now used in New York, New England and Pennsylvania, together with the railroad facilities now required in getting it there, would be released for the rest of the country.

If 4,250,000 horse-power should be utilized continuously, it would produce about 37.3 billion horse-power hours per year, or 27.7 billion kilowatt hours. Large modern power plants consume between two and three pounds of coal per kilowatt hour. Assuming the average steam electric plant consumes two and one-half pounds of coal per kilowatt hour, this proposed utilization of the power of the St. Lawrence Rapids would save 72.2 million tons of coal every year.

The question naturally arises, "Is there a demand within transmission distance of the St. Lawrence for this amount of power?" The United States Geological Survey, which is responsible for the above calculations, answers the question in these words:

"At the present time the installed capacity of prime movers in New England and New York operated by fuel power in manufacturing plants, central station and electric railways is estimated to be about 23,000,000 horse-power. Practically all of New York and New England is within reach of transmission lines from power plants on the St. Lawrence River. It is, therefore, very evident that if all the power in the St. Lawrence were available for use today, there would be a demand for every horse-power developed and the resulting saving in coal would amount to tens of millions of tons annually and New England would have no coal problem."

Estimates of the cost for the whole project range from \$100,000,000 to \$250,000,000—not a

staggering figure in these times for either the Government or private enterprise. If 2,000,000 horse-power could be sold at \$20 per horse-power-year, the revenue would be \$40,000,000 per year. Capitalized at 10 per cent., this amount of income would warrant the investment of \$400,000,000.

Time required for completion of the project would, according to estimates, run from two to five years. Coal, selling now for what formerly would have been considered extortionate prices, will never become as cheap as it once was, and the supply may be exhausted in 25 years. Certainly the demands made upon the mines will be greater five, seven or ten years hence than they are now. But the St. Lawrence River will never go on strike, and the volume of its waters will not be diminished in either 10 or 25 years. It will still be available for shipping eight months out of the year and for hydro-electric energy from January to January, and there are many friends of New York and New England and the railroads who see in the development of the St. Lawrence Rapids an ultimate relief from shipping congestion and coal shortages. Those who view the matter in this light, as well as those who look upon it from the opposite angle, will probably be heard at Denver.

As long ago as 1909 a treaty was made with Great Britain providing for investigation of "the beneficial use of the waters of the St. Lawrence River, between Montreal and Lake Ontario, in the interests of both countries." More or less interest was directed toward the project until the World War halted all industrial development except that connected intimately with military and naval operations. In March, 1910, Senator Irvine L. Lenroot of Wisconsin had incorporated into the Rivers and Harbors Act a provision requesting the International Joint Commission to investigate further and report to the United States and Canada. The cost and feasibility of building locks and dams and of utilizing the water-power available is being investigated by engineers of the two countries, who will report to the Commission in January, 1921. Meanwhile, The American Mining Congress is, along with other interested organizations, invited to formulate its views and present them to the Commission.

CHIEF ENGINEER, BUREAU OF MINES, ON WESTERN TRIP

Geo. O. Rice, Chief Mining Engineer of the Bureau of Mines, left on a trip to visit the western stations of the Bureau and some of the mining centers. While on his way West he will stop for a brief conference at Chicago and Milwaukee with the city officials, to find out about tunnels which may be contemplated, especially under Lake Michigan, with a view to the Bureau's taking up the

study of the construction of such tunnels in conjunction with the caisson disease and ventilation where marsh gas is encountered, as it was several years ago in a Milwaukee tunnel and in a Cleveland tunnel, in the latter of which a disastrous explosion occurred. An inquiry will also be made at these points and at other places as to vehicular tunnels, which has loomed up as an important question on account of the poisonous character of the exhaust gases from automobiles and trucks.

At Denver he will have a conference with Mr. Daniel Harrington, Supervising Engineer of the Bureau, who is carrying on investigations of the ventilation in metal mines, and the prevention of alloying of siliceous dust, the cause of miners' consumption.

At the Salt Lake, Berkeley and Seattle Stations of the Bureau the general question will be taken up regarding the mining investigations for the coming year. Mr. Rice will also visit some of the mines where special problems have been brought to him in the course of the year.

He also stops at Butte to confer with some of the Bureau and other mining engineers there, and then, as he states, he has a very pleasant mission to Yellowstone, where the National Park Service has been developing a small coal mine, and wanted some advice concerning its further development.

Mr. Rice then visits the Minneapolis Station for a meeting with Mr. Julihn, and from there will go with him to Houghton to attend the American Institute of Mining Engineers' meeting, and hold conference with some of the Bureau mining engineers in the Lake Superior district, where problems of the methods of mining and ventilation are being studied; also the study which has been taken up by Prof. F. W. Sperr of the Houghton School of Mines, who is consulting engineer of the Bureau on ground movements in deep mining.

Mr. Rice will return to Washington about the first of September.

Among other inquiries that he will take up with engineers in the mining regions will be regarding the draft of coal-operating leasing regulations on the public domain and regulations relating to oil shales.

Another question, that of calling the attention of the mining engineers to the possibilities of using liquid oxygen explosives. Mr. Rice recently brought out a Bureau publication on this subject following his visit to Europe, where he observed the use of liquid oxygen explosives in French iron mines in Lorraine. The Germans, who had used the explosive extensively in mining and other operations, as well as military destruction during the war, had introduced it into these French mines, and the French engineers thought so well of it that its use will be continued.



NATIONAL LEGISLATION

The Sixty-sixth Congress introduced 19,561 *bills* and *resolutions*—14,840 in the House of Representatives, 4721 in the Senate.

Passed 280 *public laws*.

There were 591 *resolutions* introduced, 196 of which provided for special investigations; 47 of these resolutions were passed and investigations conducted upon every subject from the price of men's collars and shoes to the investigation of the cause of the steel strike.

The American Mining Congress concerns itself with the securing of beneficial legislation for the mining industry, and also with the proper administration by the Departments of the laws after Congress has passed them. Because of this fact it may be of interest to note what the Departments are doing with the more important of the measures of interest to mining which passed the last session.

Water-Power Bill: Public Law 280

The Water-Power Bill, which provides for a Federal Water-Power Commission, composed of the Secretaries of War, Interior and Agriculture, is making progress.

The Commission has perfected its internal organization. It will be sub-divided into engineering, accounting, statistical, regulatory, licensing, legal and operation divisions.

For administrative purposes the country has been divided into five districts, with headquarters as follows: No. 1, Washington; No. 2, St. Paul; No. 3, St. Louis; No. 4, Denver; No. 5, San Francisco. Each of the cities mentioned will be the seat of a branch office of the commission. Applications for permits to develop power in the East, West and South have been filed with the Federal Water-Power Commission, which will be passed on at an early meeting. Because of the increasing cost of fuel

and transportation difficulties it is predicted there will be a rapid development of water-power projects. C. D. Merrill, Chief Engineer of the United States Forestry Service, has been appointed Executive Secretary of the Federal Water-Power Commission. Gen. E. H. Crowder, Judge Advocate General of the United States Army, and Herman Stabler have been appointed to draw up regulations. Lieut.-Col. A. M. Kelly, Army Engineer Corps, has been appointed Engineer Officer of the Commission.

Leasing Bill: Public Law No. 146

Much activity is being shown in Wyoming and Montana under the provisions of the Leasing Bill. Operating and drilling regulation for oil and gas wells under the law are being administered by the Bureau of Mines, which will furnish copy of regulations upon request. Frederick B. Tough of Colorado, petroleum technologist of the Bureau of Mines, is supervisor of drilling operations.

The Secretary of the Interior recently construed Section 19 of the law as permitting holding of 2560 acres for such lands in the same geologic structure, but not more than three times that area in the same State. This ruling is regarded as important to operators in fields covered by the law in Wyoming and California, because it was previously thought a lessee could not hold more than 2560 acres. This ruling means that corporations or individuals may take up a lot of 7680 acres in one State and then secure a like amount in several other States coming under the law, making a total of 38,400 acres that may be secured.

The Department does not consider "paper locations" to be valid, but insists that the bill as passed is liberal for all claims made in good faith. They define "paper locations" as merely consisting of setting stakes to indicate boundaries and the posting and recording of notices. Practically all public lands having any possible prospective value for oil are covered by such locations. The Department insists that discovery must be the sole basis for the location and validation of mining claims.

Regulations for the leasing of phosphate deposits under this law have been approved by

the Department of the Interior. About 2,500,000 acres of land in Wyoming, Idaho, Utah and Montana have been withdrawn as phosphate lands. The regulations will open these lands to lease in areas not exceeding 2560 acres each. Applications for leases are to be filed with local land officers, which will be sent to Washington for action by the Department. It is expected that the opening up of these lands will very materially increase the fertilizer supply.

Leases have been issued by the Interior Department for 1397 acres of coal land in the Cook Inlet field in Alaska, 565 acres in the Nenana field, and applications for leases of 1080 acres of the Matanuska field, and 20.0 acres in the Bering River field. These applications for leases are made under the provisions of the law dealing particularly with Alaska.

The first permit to be issued by the Department under the general Leasing Law was granted on May 18 to the Crowley County Oil Development Co. on 1280 acres in the Pueblo (Col.) land district. The first lease to be issued under the law was granted to James Owen of Denver for 280 acres in Natrone county, Wyoming.

The Interior Department has granted up to August 1 prospecting permits to the following:

F. E. Dunlap, for 160 acres in the Los Angeles (Cal.) district.

J. D. Atwood, for 2560 acres in the Roswell (New Mexico) district.

C. C. Calhoun and Henry R. Harriman, each 2560 acres in the Cheyenne (Wyo.) district.

Rocky Mountain Oil Producing Co., 1920 acres in the Cheyenne (Wyo.) district.

Wilson Hall Bennett, 2560 in the Independence (Cal.) district.

Rono Wyoming Oil Co., 2511 acres in the Lander (Wyo.) district.

F. Grant Keyes, 2550 acres in the Roswell (New Mexico) district.

Weaver W. Randolph, 320 acres in the Vale (Ore.) land district.

Percy H. Stacev, 320 acres in the Vale (Ore.) land district.

James Harvey, 320 acres in the Vale (Ore.) land district.

George Carcy, 320 acres in the Vale (Ore.) land district.

Robert D. Lytle, 440 acres in the Vale (Ore.) land district.

Harry H. Waggoner, 280 acres in the Vale (Ore.) land district.

Alice F. Wells, 640 acres in the Carson City (Nev.) district.

William P. Lakin, 111 acres in the Lewiston (Mont.) district.

Thomas A. Berkin, 200 acres in the Lewiston (Mont.) district.

John R. Devine, 1020 acres.

D. C. Mathis, 1020 acres in the Las Cruces (New Mexico) district.

Cabele Oil & Gas Co., 2300 acres in the Las Cruces (New Mexico) district.

Little Tom Oil Co., 2528 acres in the Las Cruces (New Mexico) district.

Naomi Parker, 2560 acres in the Las Cruces (New Mexico) district.

Louis E. Bedford, 2560 acres in the Santa Fe (New Mexico) district.

Frank M. Phelps, 2560 acres in the Santa Fe (New Mexico) district.

Mine Experiment Stations: *Public Law No. 21*

The appropriation providing for the establishment of two new experiment stations is having the attention of the Bureau of Mines. Dorsey Lyon, Chief Engineer of the Mining Experiment Stations of the Bureau, recently returned to Washington after making an extended trip to determine the location of these stations. The Secretary of the Interior has approved the location of a lead and zinc station in the Mississippi Valley. The second station will be devoted to non-ferrous metals, and will be located in the Southeast. Mr. Lyon visited Chapel Hill, N. C., Atlanta, Ga., Birmingham, Ala., and Knoxville, Tenn., in one of which the non-metallic station will be established. The lead and zinc station will probably be located at St. Louis, Mo., in conjunction with the station located in Rollo, Missouri.

Coal-Cleaning Plant—Alaska

The Navy appropriation bill, which carried an appropriation providing for the establishment of a coal-cleaning plant in conjunction with the mining of coal in Alaska for the Navy, is being cared for through Admiral Peoples of the Bureau of Supplies and Accounts, Navy Department. Secretaries of the Interior Payne and of the Navy, Daniels, arrived in Washington August 2 after an extended trip for the purpose of examining Alaska coal. Secretary Daniels has notified the Navy Department that the Alaska coal is suitable for the Navy use, and that a large supply is available. The Alaskan railway will be completed in about a year. A shaft has been sunk in the Chickaloon mines in the Matanuska field to a depth of 600 feet, and a number of drifts and tunnels have been constructed. It is the belief of the Secretaries who investigated this territory that it will be able to supply a large portion of the Pacific fleet's coal needs, which are estimated at the present time to be about 450,000 tons.

Labor: Women's Bureau—*Public Law No. 259*

The Women's Bureau in the Department of Labor is already functioning. Investigations concerning women in industry are being conducted by this Department in Kansas, New Hampshire, Georgia, Minnesota and Iowa. The Bureau is being established by the expansion of the former division of the Women's Industrial Service during the war. Miss Mary

Anderson of Illinois, who formerly was employed in a shoe factory, is acting director, and the staff at present consists of one industrial supervisor, two industrial assistants, two industrial agents, four special agents, an editor, a statistician and eight clerks. The Bureau has established the following standards for employment of women in industry: Eight-hour day, Saturday half-holiday, one day of rest in seven, $\frac{1}{4}$ hour for meals, ten-minute rest middle of each working period, no employment between 10 P. M. and 6 A. M., same wages as men when doing same work, wages to be established on basis of occupation and not sex, and minimum to cover cost of living for dependents and not merely for the individual, comforts and sanitary provisions, stand or sit at work, safety from injury by machinery, fire, dust, and fumes, first-aid equipment and fire drills, no lifting of heavy weights, or operation of devices requiring undue strain, women must not be employed in occupations using poisons which are more injurious to women than to men, such as certain processes in the lead industry, no home work.

RECENT MINING DECISIONS

Mining Claims—Sufficiency of Location Notice

The statute of Washington (Remington Code, Section 7035) requires that when quartz or lode claims are located as forfeited or abandoned property the location notice or certificate must state whether the whole or any part of the new location was located as abandoned property. A location notice that fails to recite that the claim was located as abandoned property is not a compliance with the statute, and is, therefore, invalid and insufficient, and no rights can be acquired thereunder.

Newport Min. Co. v. Bead Lake Gold-Copper Min. Co., — Washington —, 188 Pacific 27, p. 28.

Mining Claims—Certificate of Location Recording

The purpose of the statute in requiring a certificate of a mining location to be recorded is to impart constructive notice to subsequent locators of the existence of the claim, its location and extent, just as the markings upon the ground are intended to impart actual notice of the same facts. But when persons have actual notice of a mining location, its boundaries and extent, any defects in the recorded certificate are deemed to be immaterial.

Heilman v. Loughrin, — Montana —, 188 Pacific 370.

Mining Shaft—Fencing—Application of Statute.

The statute of Washington (Laws 1890, p. 121; Remington Code, Section 7408) requires that any person or corporation who shall sink

or excavate a shaft, excavation or hole to be used for mining purposes shall, on abandonment, erect and maintain a substantial fence or other safeguard sufficient to securely safeguard against danger of persons or animals falling into any such shaft or excavation. This statute does not apply to a slope or entry having a pitch of about 20 degrees, the outlet of which is protected by a house of timber covered with a heavy wire screen drawn across the face of the slope. There could be no recovery under the statute for the death of a boy who voluntarily entered the mine through a small door in the screen and passed down the slope for a distance of over 300 feet into the mine and was overcome and died from the effects of "black damp."

Dernac v. Pacific Coast Coal Co., — Washington —, 188 Pacific 15.

Mining Claims—Alien's Right

Under the United States mining statutes an alien is not prevented from owning unpatented mining claims, and an alien so owning any such claim may protect his property rights therein in adverse proceedings before the Land Department or in the courts, although he may not acquire title from the United States through such proceedings.

Ginaca v. Peterson, 262 Federal 904, p. 910. See Altoona Quartz Min. Co. v. Integral Quartz Min. Co., 114 Calif. 100; 45 Pacific 1047.

Mine Foreman—Negligence—Liability of Operator

The statute of Tennessee (Acts 1915, Chapter 166) requires that a mine foreman be employed in every mine; that he must have certain qualifications and be certified by the State Board, and shall perform certain duties to keep the mine safe for the miners. This statute makes the foreman the agent of the owner or operator, and does not relieve such owner or operator from liability under the doctrine of respondent superior to a miner injured through the negligence of such foreman. The statute is not invalid as depriving the mine owner of his property without due process of law in violation of the State and the United States Constitutions. The validity of the act and the liability of the owner are based on the idea that the class of duties to be performed by the mine foreman belongs to the owner or operator and cannot be delegated, and he cannot claim exemption merely because he is somewhat constrained in his choice of a foreman.

Ducktown Sulphur, Copper & Iron Co. v. Galloway, 262 Federal 660, p. 674.

Note: This ruling is directly opposed to the rule established under similar statutes in the States of Illinois, Pennsylvania and West Virginia.

Oil Shale Claims

Oil shale has long been recognized as a valuable mineral deposit and under Section 2319, making all valuable mineral deposits open to exploration and purchase, oil shale lands are subject to location as other mineral lands. The oil shale lands are now classified and listed as mineral lands valuable as a source of petroleum and nitrogen, and this is *prima facie* evidence of the value of the land so classified for mining purposes.

Oil shale having been recognized by Congress and by the Department as a mineral deposit and a source of petroleum, and having been demonstrated to be a mineral of economic importance, lands valuable on account of such oil shale are subject to valid location and appropriation under the placer mining laws to the same extent and subject to the same provisions and conditions as if valuable on account of oil or gas. The Department holds that entries and applications for patents for oil shale placer claims must be adjudicated by the Land Office in accordance with the same legal provisions and with reference to the same requirements and limitations as are applicable to oil and gas placers.

Reed & Doyle, in re — Land Decisions — (May 10, 1920).

Oil Claims—Permits to Assignees

Section 19 of the Federal act to promote the mining of coal, phosphate, oil and gas (approved February 25, 1920) provides that any person "who on October 1, 1910, was a bona-fide occupant or claimant of oil or gas lands under a claim initiated while such lands were not withdrawn from oil or gas location and entry," etc., shall, under certain other conditions, be entitled to prospecting permits upon the terms, conditions and limitations provided for in the act.

The ruling of the Department on this section is to the effect that it is sufficient if the claim was initiated bona fide on or before October 1, 1910. Under the holding and instructions it is not required that the original locator shall have made his location on or before October 1, 1910, and continued to hold the same since that date; but the section is construed to permit qualified assignees since October 1, 1910, to secure preference right permits. No such transferee, however, is permitted to hold permits exceeding 2560 acres for such lands in the same geologic structure, or more than three times that area in the same State.

Instructions, Land Department, June —, 1920.

Oil and Gas Leases—Protection of Side Lines—Offset Wells

An oil and gas lease contained the usual covenants for drilling with an agreement to pay one dollar per acre a year rental for land

not drilled upon and "to protect all side lines in case oil is found in paying quantities." By this quoted term the lessee obligated itself to protect the lessor's lands from drainage or threatened drainage by drilling offset wells on the premises if oil was found in paying quantities on any of the adjacent land. This provision imposed upon the lessee the same obligations which the courts universally hold to be upon a lessee in the absence of any such express stipulation. The term "paying quantities" as employed in the lease means that the lessee was required to drill an offset well in case oil was found on adjacent lands near the boundary line of the lessor's land in sufficient quantities to pay a reasonable profit on the whole sum required to be expended, including the cost of drilling, equipping and operating the well.

Pelham Petroleum Co. v. North, — Oklahoma —, 188 Pacific 1069.

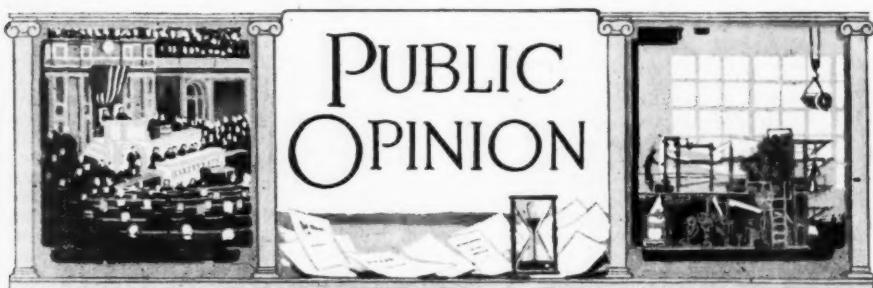
Oil and Gas Leases—Casinghead Gas—Gas Wells

An oil and gas lease provided that on the discovery of oil the lessee was to deliver to the lessor in the pipe lines one-eighth of the oil produced. The lessee was to pay \$200 in annual payments on each gas-producing well. The lessor was to have the right to use the premises for ordinary farm purposes, except such parts as might be necessary for mining operations, and to have gas free of cost for use on the premises. "The party of the second part (the lessee) shall have the right to use casinghead gas from the wells of this lease for the purpose of operating said wells."

Casinghead gas is a component part of oil and is not made from dry gas, nor is it a product of dry gas, but it is a product of wet gas, and wet gas exists only with oil. It follows, therefore, that casinghead gas is a component of oil. The lessor under the terms of the lease was not entitled to the payment of \$200 per annum on wells from which the lessee took the casinghead gas for the purpose of operating the wells. The fact that casinghead gas was taken from an oil well would not of itself make such a "gas well" within the provisions of the lease requiring the annual payment of \$200 for each gas well. The lessor was only entitled to one-eighth of the casinghead gas separated from the oil and supplied on the premises in addition to the one-eighth of the oil.

Twin Hills Gasoline Co. v. Bradford Oil Corp., 264 Federal 440.

A. E. Carlton, president of the Golden Cycle Mining & Reduction Co., was a Washington visitor during the month. Mr. Carlton made his headquarters at the offices of the Mining Congress, where his staff is working out taxation matters before the Revenue Department.



One of the most thoughtful and truthful statements of the danger we face as a nation today was made by **Charles Evans Hughes** recently. We quote it without comment:

"We went to war for liberty and democracy, with the result that we have fed the autocrat appetite. And we have seen the war powers which are essential to the preservation of the nation in time of war exercised broadly after the military exigency had passed, and in conditions for which they were never intended, and ... may well wonder whether constitutional government heretofore maintained in this Republic could survive another war, even successfully waged."

According to the belief of some of our leaders in industry, pessimism has been with us altogether too long. The time is now here when those who take an optimistic view of conditions in this country should come forward and be heard. Judge **Elbert H. Gary**, chairman of the board of the United States Steel Corporation, just before sailing for a period of rest in Europe, said:

"I am more optimistic regarding the future of the United States than I have been in the last six years. There is no conflict between capital and labor. Each is dependent upon the other. Both recognize this fact. The almost innumerable troubles which have resulted in strikes and often riots and bloodshed during the last year or longer have been between employers and labor union leaders who have not represented or been requested to represent the great majority of workmen. The right to organize is not disputed. If law and order are continuously preserved by the authorities and men and property are protected against lawlessness, all labor questions will be solved voluntarily by

those who are directly interested to the satisfaction of themselves and the general public as well. Labor has never before in any country been paid as high compensation in proportion to the costs of living as it has been paid during the last few years, and is being paid at the present time. While I recognize, and for many months have comprehended, dangers in the general situation, I am more optimistic in regard to the future of this country than I have been at any time before during the last six years."

The agitation by the labor unions for a six-hour day has brought forth the following interesting comment from the editor of *The Wall Street Journal*:

"Labor's demand for adoption of a six-hour day may appeal to those who are born tired. But to the man who wishes a permanent betterment of his condition the proposition should make no appeal. Wages are the result of production. They are paid out of production, therefore, they are measured by it. Adoption of a six-hour day would greatly limit production. Its advocates admit that self-evident truth. At the Industrial Convention, held in Chicago late in May, one speaker said: '*He who expects to draw wages will have to work for them.*' Here is a great economic truth so tersely given that all should understand it. Ages ago, when Eden came to an end, it was still better stated: '*In the sweat of thy face shalt thou eat bread.*' Wages are the result of production; they depend upon it; they are large or small in proportion as their source, production is large or small. If but little is put into industry, but little can come out. If a man wishes to get more, he must earn more, produce more."

Vigorous discussion has arisen due to the recent report in some of the most sensational newspapers of the alleged at-

tempts by Great Britain to corner the world's oil supply. While other countries seem to be temporarily at least taking the lead in foreign development, the danger of this development to America has been somewhat exaggerated, in the opinion of **Thomas A. O'Donnell**, president of the American Petroleum Institute, who says in the *Petroleum Age* for July that:

"Recognizing the indispensability of oil to modern civilization, Great Britain has been alert to assure her future in this respect; and French, Dutch and Japanese policies, though of lesser magnitude, have been inspired by a similar purpose.

"It would be a grave misapprehension to assume that the oil industry of the United States has meanwhile been wanting either in vision or in action. Although the aggressive policies of other nations have but recently claimed the attention of Congress, the leaders of the oil industry long have looked into the future, and while not underestimating the results attending the coalition of diplomacy and business in foreign petroleum ventures, they do not accept the extreme view that Great Britain in its control of so much potential oil territory has captured all the future sources of supply.

"But American-owned companies and prospectors have sought new production in other lands at their own risk and without the aid of Government encouragement or co-operation. Exclusive privileges never have been asked of any foreign government, nor has our own Congress ever been requested to render financial assistance, nor has it given to our nationals a full measure of support in their efforts to secure foreign fields.

"The American oil industry asks only the support of the nation in giving it an equal status, putting it upon an equal footing, with the nationals of other countries in the development of the world's petroleum resources—and it asks this in the interest of the nation.

In further substantiation of this position, Sir Auckland Geddes, British Ambassador to the United States, in the same journal states as follows:

"Seventy per cent. of the oil production of the world comes from your own soil, which in time of emergency can be absolutely controlled by your own Government. Sixteen per cent. comes from the soil of Mexico, and of that, American

capital controls three-fourths. In 10 other countries American oil interests have either got secure production or are preparing to develop known fields. In all, the United States controls at present 82 per cent.—at least 82 per cent. of the oil supply of the world; and the alleged monopolist, Great Britain, from the whole British Empire, gets only 2½ per cent. of the world's supply.

"From Persia, where the oil development is under British control, through British capital having been employed, there is 2 per cent. of the world's production, and from the rest, Burma particularly, British capital gets another small fraction, which brings the total amount of oil under British control in time of emergency up to a total of about 5 per cent. Now, these facts are uncontrovertible.

"You may say, 'That is all right as a statement of the present position. But what of the future? Britain has got all the undeveloped territories?' It really isn't so. I see it stated in your press that Britain is controlling the oil supply of Batoum and Baku. We do not own Batoum and Baku. It is true there is a handful of British troops at Batoum—they with some French and Italians—but they are not there representing Britain; they are there on behalf of the Allies.

"Then, I see it said that we are going to control the whole of the oil supply of Mesopotamia and the whole of the oil supply of Palestine. We do not own Mesopotamia; we do not own Palestine. It is true that under the draft treaty of peace with Turkey we are to receive a mandate from Mesopotamia, and that is supposed to mean that we are going to own Mesopotamia, but also under the draft treaty Mesopotamia is made a free and independent country.

"The latest yarn that I see is that we are building a pipe line from Bagdad or Mosul to Haifa on the Mediterranean to bring oil from upper Mesopotamia to the Mediterranean. I wish to state categorically that no such construction work has been undertaken.

"Quite obviously, oil is of great importance to the future, and I would say this, that if I saw any chance of any combination of British companies in securing a monopolistic control of oil, I would be against it.

"Now, England is not striving—Britain is not striving to get a monopolistic control of oil. Her companies are active. I hope they are. Fair competition is no crime, and it will be all for the good of everyone if we have free competition in connection with this vital substance."

H. G. James, whose writings are familiar to all readers of petroleum publications, is further reassuring in the following statement in the same magazine:

"American capital is pouring into Colombia and other north South American countries, and it is doubtful if directly or indirectly English capital has any such investments. Numerous test wells are being drilled by American corporations. Concessions on nearly every acre of public land in some Central American countries are held by Americans.

"A single American oil company has more extensive exploration work under way in some southern countries than all of the combined organizations of Europe. Hundreds of thousands of dollars have been sent into China, Japan, Palestine, Java, Sumatra and the far East by Americans to develop oil. The Standard Oil Co. is largely interested in production in Roumania, Java—in fact, in practically every foreign field.

"Our Government makes no effort to encourage American petroleum development either at home or abroad.

"Further, for nearly a quarter of a century Washington has persistently insisted that oil was nearing its end; that a fixed percentage of the nation's petroleum resources had been used up, and predicting the exhaustion and collapse of the industry. The time has invariably been set at 20 years. Twenty years have passed, and we are producing more oil in a single State now than we did in all States 20 years ago, and we have more oil 'in sight' today than ever before.

"All of this has a direct bearing on the question of British world-control of petroleum. America cannot enter into competition for her rightful place in universal petroleum research with divided ranks, permeated with prejudice and misunderstanding, with England united and with full understanding of her aims and purposes. With American oil interests united and with governmental sympathy and co-operation, no other nation can possibly wrest from Uncle Sam his supremacy in oil."

There is no more important subject confronting the people today than that of taxation. With the growing sentiment in favor of a revision of our revenue laws, it is interesting to note the comment of **Jules S. Bache** before the Broadway Association recently, when he

designated taxation as a "blight" to the business of the country. Mr. Bache said as follows:

"A diagnosis of the blight spread over the business of the United States would show two principal diseases: The tyranny of labor and the tyranny of taxation.

"The first disease has already passed the crisis, and is on the mend. The taxation disease is more serious, because the people at large, being less directly interested, first, fail to realize the situation, and, second, once they do realize it, will be confronted with so many remedies that they will surely become confused, and even paralyzed in endeavoring to discover the correct one. The tax is so burdensome that even the most upright and patriotic see the necessity to employ experts to endeavor to reduce the burden within the construction of the law, while the dishonest and unscrupulous use every means to evade the tax. The declarations heard on all sides that the excess profits tax must go, even though there seems no immediate likelihood of this type of tax being repealed, do not go far enough. The super-tax on incomes must go, and go speedily, or all incentive to increase earnings will be removed. Possibly other and better methods may be discovered, but for the moment nothing seems to recommend itself as well as the commodity or gross sales tax. We must raise \$4,000,000,000 annually during the next few years. How can we raise four billions and not paralyze industry? To raise it under the present methods means the continuation both of the excess profits tax and of the insufferable super-tax. It means that great capitalists will continue to withdraw their money from business enterprises and invest it in municipal and other tax-exempt bonds, leaving the burden of enterprise on those of moderate means and on the active business element of the country. Progressive business organization consists of three parts: Labor, management and capital; all being interdependent each on the other. If present conditions continue, I fear that we will have plenty of labor and plenty of management, but that capital will disappear, and while I am not of those who recommend that capital should strike, it will be forced to strike for lack of protection. Three hundred or four hundred thousand investors have disappeared. Such of them as still have income exceeding their annual expenditures seek the umbrella against taxation of the municipal investment. When well secured 8 per cent. investments cannot be sold this situation becomes acute. That situation confronts us today. I do not anticipate relying en-

tirely upon the commodity tax for the raising of all the moneys necessary for the maintenance of our Government. Nor do I think it would be fair to do so. There should be a normal, and even a substantial, income tax. But I believe that with a minimum sales tax, if strictly levied on all transactions, the income tax would never need to go over 5 per cent."

Senator Harding in an interview outlined in *Old Colony Magazine* said:

"America has no problem transcending in importance the securing of industrial peace and the resumption of production. No man can ever be made to work against his will in this country, and the student of modern developments in industry who thinks to destroy unionism and collective bargaining little understands the new order. It is just as certain as anything can be that a new proportion has come in the division of the profits of production, and that labor's share will never grow less. But unionism, which has been a liberating force, must not be permitted to enslave. Collective strength has wrought great progress, but it must not assume dictation."

Forty-nine New York manufacturers operating in 40 different lines of industry made public a statement concerning the increased efficiency of labor within the past few months.

"This testimony is submitted to the Industrial Bureau of the Merchants' Association by the same manufacturers who reported in September, 1910, that in general labor was not more than 70 per cent. efficient, judged by normal standards.

"Although production per man per hour has not yet reached normal, it has been gradually improving since last September, especially during the last four or five months, and a spirit of optimism regarding the productivity of labor is now prevalent among manufacturers.

"It is not possible to measure the increase in output on a percentage basis except in special cases, and it cannot be said that the increase is as yet remarkable, but the testimony is unmistakable that a change for the better is now well under way.

"Of the 40 manufacturers who reported, 23 say that the efficiency of their employees has increased noticeably since last September; five say that although they have seen no measurable increase, they sense a better spirit among their employees; 17 say that they have observed no change, and three say that they have noted a decrease.

One manufacturer reports that it is his observation that labor efficiency is increasing in many lines of industry, although he has available no specific data for his own plant.

"The reasons given for the present tendency toward increased productivity per man are varied, but those most frequently cited are the increase in the number of applicants for positions and the change from timework to piecework."

In a most comprehensive analysis of the Railroad Wage Award in *The Wall Street Journal* for Monday, July 26, the following basic conclusions are arrived at:

"Somewhere around 1,800,000 workers have been fighting with all the skill they could command to get all the money they could from 105,000,000 citizens of this country, and the amount has been, at least presently, determined by the legal representatives of the 105,000,000 people.

"The difficulties of the Railway Labor Board should not be minimized. The award they have made is readily subject to the easy criticism of those who not only could have done no better, but probably would have done much worse. Scientifically analyzed it is a pretty poor award, but statistically considered the wonder is that it is not much worse.

"You cannot readily adjust the physical appetites and psychological apprehensions of 1,800,000 employees to the scientific value of a dollar that fluctuates in response to the productive and purchasing vagaries of a nation. It is no criticism of the labor of the Board that made this award to say that it is a bad award; in fact, nothing but a bad award could be made now.

"The statistics of railway labor have been so badly kept and so variously recorded that comparative statements are not much better than guess-work. In this the Labor Board is quite as much at a disadvantage as are the rest of us. The best the Board, as well as we, can do is to make the best guess that can be made from the disjointed and unrelated facts that exist.

"The statistical assertion that the 'cost of living,' so called, has advanced 94.8 per cent. since 1914, may or may not be so, but there is no competent evidence to support it.

"If the wages for 1910 had been equalized with the increases of living costs from 1915, on the most liberal basis claimed by the men, and which is neither statistically nor economically defensible, it

would only have required an advance totaling \$43,773.474. This, however, is arrived at by deducting from the total deficit from such equalization the total excess. Of course, at this stage of the game nobody expects reduction of wages, and ignoring entirely the excess, the total of deficits only is about \$135,000,000. So that, at least, the men have received almost \$400,000,000 more than would equalize them with what they erroneously claim is the advance in cost of living."

The Chicago *Tribune* has published the following copyright cablegram. This is as pertinent a commentary on the conditions in idealistic Russia and realistic America as any 1000-word article could possibly cover:

"On the bureau of Emma Goldman's room in the Hotel Astoria at Petrograd, draped over a corner of the picture of her niece, is the American flag. Emma Goldman, deported from America as an anarchist, makes no apologies for this flag.

"The communist leaders living at the hotel josh her a little about it, but Emma says:

"That's the flag of my niece's country. I'm going back there some day, for I love America as I love no other land."

"Emma Goldman is sick of Bolshevik Russia. When I called on her in Petrograd she asked: 'What do you think of it?'

"You have been here six weeks. How do you feel about it?"

"It is rotten," I replied. "It's so rotten I'm sick of it."

"You're right, it is rotten," she said. "But it is what we should have expected. We always knew the Marxian theory was impossible, a breeder of tyranny. We blinded ourselves to its faults in America because we believed it might accomplish something."

"I've been here four months now, and I've seen what it has accomplished. There is no health in it. The state of socialism or state of capitalism—call it what you will—has done for Russia what it will do for every country. It has taken away even the little freedom the man has under individual capitalism and has made him entirely subject to the whims of a bureaucracy which excuses its tyranny on the ground it all is done for the welfare of the workers."

MORE FREEDOM IN UNITED STATES.

"Where did you find the greater degree of freedom, Miss Goldman?" I asked. "In the United States or in Communist Russia?"

"Any form of government is bad

enough," she replied, "but between this and individual capitalism, the choice lies with the latter. At least the individual has a chance to express his individuality."

"Of all the deportees who entered Russia with Miss Goldman, only one or two have accepted the doctrines of communism. Miss Goldman, Berkman and Novikov, the leaders of the group, refused to work with the Government in any way except purely humanitarian labor.

EXPECTS TO GO TO JAIL.

"We are studying conditions in Russia," said Miss Goldman at another time. "We want to make a trip through the country districts and talk with the peasants. Then we will be ready to speak. We probably will go to jail when we start criticising, but that doesn't matter. We've been in jail before. We cannot be true to our principles and not speak."

"Miss Goldman and Novikov refused places in the reviewing stand at the May Day procession, nor will they accept places at any Government meeting.

EMMA "HIT HARD."

"I spent much of my week in Petrograd with them. When I was ready to leave she said to me: 'Be careful what you write, if you want to return to Russia. If you don't, then hit out from the shoulder and hit hard. You may be called an agent of the capitalistic class by the people in America who don't understand.'

"If you are, tell them we have been here four months and now we know. We have investigated the factories, homes and institutions as no newspaper man can be permitted to investigate them, and we've found them bad. I know from my conversation with you you have gotten at the heart of the matter. It's up to you to tell the American people, and tell them straight."

"And that is what I intend to do. Emma Goldman has found, as I did, that the best cure for Bolshevism is a trip to Bolshevik Russia. She told me to hit out straight from the shoulder. Well, as an American, I'll let that little flag of Emma's bureau hit for me."

Law and Labor, on its cover for July, says:

"The widest latitude should be offered to workers to improve their condition by organization, but in the extension of their privileges the reasonable rights of others guaranteed to all alike must not be subverted if the spirit of the Government is to be preserved. These privileges of the workers will be modified as time passes so as to enlarge the opportunities to improve their condition, but it can only be

**THE
MINING CONGRESS
JOURNAL**

PUBLISHED EACH MONTH BY
THE AMERICAN MINING CONGRESS,
Munsey Building, Washington, D. C.

OFFICERS:

Bulkeley Wells, President.
Harry L. Day, First Vice-President.
Daniel B. Wentz, Second Vice-President.
E. L. Doheny, Third Vice-President.
J. F. Callbreath, Secretary.

DIRECTORS:

Bulkeley Wells, Denver, Col.
Daniel B. Wentz, Philadelphia, Pa.
John C. Howard, Salt Lake City, Utah.
Thomas T. Brewster, St. Louis, Mo.
Samuel A. Taylor, Pittsburgh, Pa.
L. A. Friedman, Lovelock, Nev.
Carl Scholz, Charleston, W. Va.
Harry L. Day, Wallace, Idaho.
Charles S. Keith, Kansas City, Mo.
Walter Douglas, New York.
F. L. Doheny, Los Angeles, Cal.
E. P. Matthewson, New York.

Paul Wooton, News Editor.
New York Office: 307 Fifth Ave. Tel., Murray
Hill 3830.
Chicago Office: 902 Majestic Building, Tel. Cen-
tral 3744.

Subscription Rate, per year..... \$2.00
Single Copies..... .20

Entered as Second Class Matter January 20, 1915,
at the Postoffice at Washington, D. C.

AUGUST, 1920

done by acquiring the confidence of the general public that the changes are in the interest of the common good and that the workers through their unions can be trusted to exercise them equitably by lawful means and not through force or violence or similar measures. The trend of public sentiment is and has been to increase the rights and privileges of the workers, * * * but it has not reached that point where those things can be brought about by the use of force or its equivalent, which would be destructive of all rights and would make insecure the very rights which are sought to be obtained thereby. These rights and privileges cannot be extended so as to constitute an arbitrary domination of the reasonable rights of others or so as to be subservient of the Government itself or so as to be contrary to the public interests."

The *Mining Review* says that the Plumb plan boosters and the others who want somebody besides the owners to own the railroads should look up the facts and see who does own the railroads. More than 1,000,000 people own \$10,000,000,000 worth of railroad stocks and bonds. Life insurance companies, with 53,000,000 policy holders, own nearly \$2,000,000,000. Savings banks, with 10,000,000 depositors, own \$847,000,000. Other insurance companies than life own \$650,000,000. Various institutions, benevolent and otherwise, own \$350,000,000. Trust companies and State and national banks own \$850,000,000 worth of these railroad securities. If the people do not own the railroads now, they never will.

ADOPTS INDUSTRIAL PLAN

Announcement that plans were in contemplation under which employees of the Federal Electric Co. would have a voice in the management of the company was made by John F. Gilchrist, president, in an address delivered on June 26 at a housewarming at the concern's new plant, Eighty-seventh and State streets, Chicago.

"We want our employees to feel that their efforts are being appreciated," declared Mr. Gilchrist. "We cannot give a definite outline at present of what the plan will be, but it will be in conformity with some of the new ideas of employees' representation."

Mr. Gilchrist told the employees that they could purchase stock in the company at almost any terms convenient to themselves, and said he was very pleased to observe that approximately 40 per cent. of the employees were already stockholders.

More than a thousand persons were guests at the housewarming, which was celebrated by dancing, baseball games, field events, vaudeville, aeroplane ascensions and a luncheon.

**ROLLA SCHOOL OF MINES
HAS NEW DIRECTOR**

At a recent meeting of the Board of Curators of the University of Missouri, Dr. Charles H. Fulton was appointed Director of the School of Mines and Metallurgy, a division of the University of Missouri located at Rolla, Mo. Professor Fulton has been head of the department of metallurgy at Case School of Applied Science, Cleveland, O. He is a graduate of the School of Mines of Columbia University, New York, and was formerly president of the School of Mines, Black Hills, S. D. He has been head of the department of metallurgy at Case School of Applied Science for the past 10 years. Dr. Fulton was appointed to succeed Prof. A. L. McRae, director of the School of Mines and Metallurgy at Rolla, who recently retired on a Carnegie pension.

MINING AND PETROLEUM DIGEST

Vanadium Development

The engineers of the Vanadium Corporation of America have issued the following announcement through the pages of *The Wall Street Journal* concerning the recent developments on their properties:

"Engineers of Vanadium Corporation of America have discovered large ore deposits on the South American properties, which, it is estimated, at present rate of consumption can supply ore indefinitely. Up to the present time known ore deposits on properties were given a life of approximately 20 years, at rate at which ore was being extracted.

"Merrill G. Baker, vice-president, returned from an inspection of properties two weeks ago, and at directors' meeting last Wednesday made known to board the discovery of new deposits.

"No detailed estimate is obtainable from officials of company as to value or amount of ore bodies which have been discovered.

"J. Leonard Replogle is to sail today on the Mauretania for England, and it is believed he will make arrangements for allotment of a larger amount of vanadium to Europe."

Asbestos

The increased use of asbestos as an industrial mineral in the production both of fire-proof fabric material and covering for steam pipes has caused such an increased use of this interesting mineral product as to cause great increase in price and diminution of stock on hand.

But says the *Mountain States Mineral Age* in a recent issue:

"Just when the supply of raw asbestos was running low and manufacturers and users of that well-nigh indispensable fireproof article were beginning to work about the future supply, Mother Earth came across with an abundant supply in new localities.

"Arizona and China are separated by thousands of miles; nevertheless they figure in the latest asbestos news.

"Out in Apache county, Arizona, an asbestos claim has been located. The deposit is said to be extensive, having been traced a distance of more than 20 miles. Vein exposures are so prominent that, according to reports, one can, without the aid of miners' tools, pick up a ton or more of crude asbestos that has broken down from the exposures. Material from the deposits examined at the United

States Bureau of Mines shows it to be strong, flexible and silky. It occurs in cross fiber veins with a fiber length of from one to one and a quarter inches, while fiber two and a half inches has been reported.

"The deposit, however, occurs on Indian reservation, and unfortunately the present law does not permit the development of asbestos deposits on unallotted Indian lands. The Commissioner of Indian Affairs, through the Secretary of the Interior, has recommended that authority be granted to develop such lands for the purpose of mining asbestos, coal, oil and gas, as well as metalliferous minerals.

"The American consul at Chungking, China, reports that asbestos has been found in various parts of the wealthy province of Su-Chuan, particularly in the district of Yachow, the Chienchang Valley and the mountains around Tachien-lu. The asbestos was found by the people who were searching the mountains for fuel and the medical roots. Claims have been located and specimens sent out for examination."

Further reference to these Arizona asbestos developments is made in the magazine *Asbestos*, published in Philadelphia, which states as follows:

"This district is in Arizona, either on the Salt River, which fills the well-known Roosevelt Reservoir, or on its tributaries or in the Sierra Ancha, the dumps of the latter workings being visible to the traveler from the famous Apache Trail connecting Globe and Phoenix.

"The mining camps are isolated, and men and beasts are very often thrown on their own resources when traveling to and fro between Globe and the camps.

"Stretches of so-called 'desert' of many miles have to be traversed and, while during several months of the year, when rainfall is abundant, this 'desert' is rather more an enchanted garden than anything else, human habitations are few and far between, and woe befalls the inexperienced traveler who loses his trail and goes into what seems to be an unlimited wilderness of cactus growth of gigantic dimensions, of thorny bushes and sun-baked mesa."

Asbestos is one of the minerals which was omitted from prospective development in Indian land by the passage of the law a year ago permitting mining locations and development upon Indian land.

An attempt to remedy the situation has been made by Representative Hayden of Arizona in the introduction in Congress of a measure to permit the filing for development of non-metalliferous minerals on Indian land. It is expected that this bill will have attention early in the next session of Congress.

Financing a Prospect

It has been a well-recognized complaint of mining prospectors and small developers for years that they had had difficulty in convincing capital of the value of their holdings and the large possible profits in their undertaking. What a prospector should offer and what he should expect in return is well set forth in the *Magazine of Wall Street*:

"A man from one of our Western mining States came to my office the other day and said he had a wonderful opportunity to offer any of my clients who would give him a little financial assistance. He was positive that his mine would become a big producer, and all he needed was about \$25,000 to make the demonstration. To the man who would put up his money for development purposes, the owner of the property offered terms that he considered almost munificent.

"He offered to 'let me in' on this unattractive speculation by offering to any of my friends an opportunity to buy 50,000 shares of the stock of a mining corporation capitalized for \$2,000,000, divided into 2,000,000 shares of par value of \$1, all for \$25,000 cash!"

"Such an offer does not constitute a 'square deal.' For the vendor it is a clear case of 'heads I win and tails you lose.' Any contract that involves the sale or development of a mining property, the value of which is speculative, should offer to buyer and seller opportunity to share in possible profits, in proportion to the risk that each assumes, so far as these risks may be determined. The general arrangement that is usually most satisfactory in connection with the sale of a mining prospect, or partly developed mine, is the lease with option to purchase, usually referred to as a 'bond and lease.'

"To illustrate the application of this form of contract, let us use the case of the old prospector who demands \$50,000 cash for his claim. A prospective buyer will not consider paying \$50,000 for a property unless he thinks there is a fair chance to get his money back, together with a profit commensurable with the risk. If the risk is great, his possible profit should be great in proportion.

"The first step in the negotiations would no doubt be a demand on the part of the prospective buyer for an option to purchase for, say, 30 or 60 days, or whatever period is necessary to make an examination of the property

for the purpose of deciding what risks, if any, he is justified in assuming.

"Under ordinary circumstances, a decision to purchase for cash would be made only in payable ore in sight to yield a net income sufficient to return the \$50,000 purchase price, together with a reasonable profit. He will retain the privilege of either buying the property for the purchase price demanded, within a certain time limit, say, two or three years if he can make the mine worth the money within that time, or forfeiting his lease, and quitting. The option privilege in such a case is usually contingent upon the faithful performance of the covenants of the leasing agreement.

"Such an arrangement is fair to both parties at interest. The vendor eventually gets his price if the mine is worth it. In addition, he receives a royalty on the ore shipped under the agreement of lease. He assumes no risk of loss."

Copper

The *Annalist* has the following to say of the copper situation, with regard to the surplus and with regard to present and future demand:

"In the United States there is also a heavy underlying demand for copper, but circumstances are such that it does not make itself manifest.

"Electrical equipment companies are making extensive plans for expansion of their business, and by the same token there should be an expansion in the buying of copper.

"In the first nine months of 1919 Japan took about 27,000 tons of copper. It appears now that the buying was in part speculative and in part based on the greatly stimulated industrial needs of the empire.

"The financial situation in Japan at the moment is such that no further buying of copper may be expected for a long time.

"At present production is on a curtailed basis. This plan was adopted last year as a step in meeting the condition brought about by overproduction. Many mines were cut down to less than 50 per cent. of capacity. At present the copper companies are producing on a basis of about 60 per cent. of capacity, and there will probably be no change in this until later in the year.

"Considering present costs, the selling price of the metal at 19 cents a pound is low. There is not any very wide margin of profit at this level. The average cost of production is probably in the neighborhood of 16 cents a pound, or an increase of from 75 to 80 per cent. over the figures of 1914. It is plain that the selling price is so close to production costs that few mines could afford to sell the metal at a figure lower than that now prevailing, and it is in line with the facts that an advance in price should be looked for before the end of this year, provided the extensive purchasing which is predicted comes to pass.

"It is not too much to say that, as compared

with this time a year ago, there has been an improvement of 100 per cent. in the copper industry. The copper producers have been working back to a basis upon which can be built an era of real prosperity.

"For one thing the copper surplus is a thing of the past. During nearly all of last year it hung over the industry as a threat against producer and consumer, but gradually the excess has been absorbed, and the surplus which now exists is not far above the normal quantity of copper that is always in play as a necessary adjunct to the carrying on of the industry.

"Although buying recently has been light, the big producers are holding firmly for 19 cents a pound as compared with a price of slightly above 14 cents, which ruled at one time last year.

"The liquidation of copper has been extensive the world over, and it may truthfully be said that in many countries the shelves are swept clean. Even in the United States there is no excess of copper in the hands of manufacturers.

"Naturally, one of the chief difficulties in connection with the purchase of the metal by Austria and Germany is the depreciated condition of the exchange as related to the two countries. This is not going to correct itself, perhaps, for years, and it is, therefore, necessary that some credit arrangement be made if any large amount of metal is to be taken by the Central Powers.

"The plan under which France is receiving copper from this country is a working agreement of great importance both to France and the copper producers here. In substance, it provides for a revolving credit which can be extended to a reasonable time. The French manufacturer gets his copper and sells his manufactured goods, obtaining thereby the funds to pay for the copper. The payments are guaranteed by several of the leading French banks.

"This plan was undertaken only recently, and in its first stages called for the organization of a Copper Finance Corporation. As it is now working out, the entire matter is in the hands of the Copper Export Association, an organization formed early last year to act for the American producers of copper in the foreign markets. It is expected that France in the course of two years, during which the agreement will run, will take about 200,000 tons of copper. An identical or similar plan may be worked out for application to Italy and some of the other countries which are short of copper, and in this way a big field will be opened up for the export of copper.

"That Europe will need large amounts of copper is indicated by the plans which are being made for the application of electricity to railroad and industrial enterprises."

Mining in New Mexico

The *Southwestern Magazine*, which has recently enlarged activities and has become a semi-technical journal, has this to say of renewed mining development in the Silver City district of New Mexico:

"The old Black Hawk mining district, New Mexico, is known wherever mining talk is indulged in as one of the famous silver producers of the early days. It might be said here that the Central, Hanover and Santa Rita mining districts join together what is generally regarded by mining experts as the largest section of mineralized country in any part of the United States. The great bodies of low-grade copper are occasionally pocketed with high-grade copper, gold and silver. Native copper in sheets, several nuggets of gold and some good silver values are taken out once in a while in the several mines of this district. The whole district shows high mineralization in these three metals. In the Hanover district much high-grade lead and zinc are found. The town of Black Hawk, as it is named, consists of 24 families or more, and is an ideal place to live. Most of the local officials have their residence on the property."

This is of particular interest, in view of the proposed new chapter of The American Mining Congress which is to be organized in New Mexico.

The view of this paper, published so close to the border, of the Mexican situation is entitled to serious consideration. It makes this appeal for recognition of the present Government in Mexico, which is apparently more friendly and more determined to protect American interests than any which has been in existence there for some time.

"The only group of men that have ever been friendly in truth to the United States are now in power in Mexico. Give them a chance. Steadily throughout the great war, General Pablo Gonzales was a consistent friend of this country. P. Elias Calles, while Governor of Sonora, and since that time, has proved himself a square, open and aboveboard friend. Adolfo de la Huerta has repeatedly shown his admiration and good-will for us. Give them a chance. If there is to be any hope for Mexico in the next decade, these men will provide it. If they fail, there is absolutely no other group of men able enough to get anywhere. They have rebuked Villa and his lawless friends, and others of the same caliber. They have, in so far as they have gone, set their houses in neat array, and above all have offered us the only real assurance of protection along the border we have had since Porfirio Diaz went out of power. The record of

Mexico is one long list of corruption, assassination and misrule. The group at the head of affairs now are apparently honest and able to give some sort of stable government to the ignorant and bandit-overrun people. Give them a chance. As soon as at all consistent the United States Government should recognize the new Government and give it every aid possible under the rules of international diplomacy."

Oil

The danger of over-capitalization and over-confidence, in short, the danger of spreading the butter of your possible capital too thin on the bread of your prospective business, is shown in the *Magazine of Wall Street* in the following:

"The overwhelming desire of even conscientious oil operators to attain super-riches and become super-oil kings is the rock on which many a promising oil ship founders.

"The reference is not to the many fraudulent oil propositions on the market. It is to the well-intentioned oil companies owning fair-sized leases located in good fields, whose officers and stockholders begin with every honest intent, but become the victims of over-confidence and the 'oil king' epidemic.

"These companies start right. Their capital is small—so is the acreage. They can either drill a well and sell the oil produced or wait until the development of the field reaches their lease and sell out at a handsome profit. In either case, those interested reap small fortunes and the company itself, having a reserve in its treasury, can look around for another opportunity.

"As soon as the new stock has been sold, tripling, as like as not, the company's capitalization, the frenzied expansion program is set in motion. New leases, more leases, and still more leases are bought—and at almost any price. Then come the plans for pipe lines and refineries.

"But with all this lease buying and pipe line construction and refinery construction, there has been made no material progress in the essential department, which is drilling for oil. Worst of all, Eastern interests are beginning to demand a financial statement.

"That is the beginning of the end. The report has to be prepared. It shows immense leasehold acreage, purchased at inflated values. It shows a large capitalization, money expended for equipment of problematical value, no cash in the treasury and only the original wells. Quite enough, in other words, to put an end to the sponsors' dreams.

"There follows a period of stagnation, in which the stockholders rush to sell the stock they hold, only to find that the bottom has dropped out of the market. And the receiver does the rest.

"All this because a small company, with

every prospect of success, yields to wild fancies and undertakes to triple its size overnight."

Frequent reference is made to valuable patented processes which are withheld from the market because of the necessity of disposing of less valuable patents and the right under them prior to the promotion of the new one. Whenever this is done to the detriment of the public interests the patent laws in their true purpose are being perverted. Particularly as this applies to the oil business, which has a certain necessity for increased development and increased efficiency in the production of petroleum products. If there be any foundation in fact for the editorial comment in the *Oil News* for July 20, it surely offers a grave problem to the consumer of petroleum products in this country:

"We have become so familiar with the laborious process of 'cracking' petroleum oils by high temperatures and pressures that we have forgotten that a simpler and safer method of breaking down high-boiling oils into lower boiling oils has been known since 1877. In the cracking process there is always a deposition of coke on the inner walls of the heating element, so that the tensile strength of the steel becomes problematical. The oil vapors at high temperatures ignite spontaneously when they escape through leaks in the still.

"The Friedel and Crafts English patent of 1877 utilized anhydrous aluminum chloride to make good heavy oils and to convert the less valuable portions of the crude into gasoline. McAfee in 1915 further developed the process. He found that with proper control of the vapors leaving the distilling system and entering the final condenser, and with sufficient time given the aluminum chloride, high-boiling oils can be completely broken down into lower boiling oils, and no matter how unsaturated the high-boiling hydrocarbons may be, the low-boiling oils produced therefrom are sweet smelling, water-white and saturated and need no refining with sulphuric acid. The reaction gives little gas and only about the right amount of carbon to allow production of saturated products. The carbon is deposited, not in the form of a hard baked-on carbon, but as a granular coky mass, easily removed from the still.

"The process has not been a commercial success because the aluminum chloride is enmeshed in the mass of coke in the still, and until recently could not be cheaply regenerated.

"About a year ago an inexpensive method of recovering the aluminum chloride was brought to the attention of a large oil company which tested the method thoroughly and pronounced it successful.

"The question arises as to why this process

is not now in commercial use. The answer probably is that this company will not put this process into practice until it has succeeded in contracting with sufficient other companies who wish to use its present cracking process so that the royalties thus received will reimburse it for scrapping its present cracking equipment.

"It is difficult to see how the patent laws can safely be changed to penalize the non-use of processes, but it does seem regrettable that such a valuable process is not put to work serving the public."

One of the interesting oil propositions which have been brought to this office recently was one in which an intricate form of divining rod was used for the location of the supposed oil deposit. Of such method of discovery the United States Geological Survey has the following to say in a series of warnings issued to prospective oil investors:

"Even in a region that is known to be oil bearing and in areas having the most promising geologic conditions a positive statement that oil in paying quantity is sure to be found in certain areas is not justifiable.

"In spite of all these facts some men who call themselves 'diviners,' 'oil finders,' 'oil witches,' and other names suggestive of unusual powers, pretend to be able, with or without the assistance of instruments, to detect unfailingly the presence of oil in paying quantity. Nearly all the methods employed by these men are based upon superstition or upon some supposed supernatural practice, just as were the methods of the old-time alchemists, who claimed the power to change lead, iron and other base metals to gold.

"Some of the 'oil witches' simply use a forked stick, like the peach-tree twig or the hazel wand of the 'water witches.' Others have elaborate instruments, fitted with magnets and coils, supposed to work through 'magnetism,' or provided with parts made of platinum, gold, silver, copper, lead, iron or some other metal, supposed to work through 'affinity of metals.' These men are usually ready to prove the correctness of their guesses with somebody else's money, but there is hardly a record of an 'oil witch' risking his own money on his 'certain knowledge,' and of the thousands of devices tested not one has proved to be of the slightest value as a means of finding oil.

"Now and then, of course, oil is struck at a place chosen by the use of one of these devices, for in a region where oil may exist occasional success in finding it by any means is inevitable. A great many of the best oil fields in the United States were found by blind, random drilling, with no attempted guidance, either scientific or supernatural. As one sagacious old driller remarked, 'Even a blind pig rooting

for nuts is bound to find some if there are plenty of them and he hunts long enough."

The Survey further states, with regard to the size of individual oil pools and the probable location and migration of oil, as follows:

"Most of the wells drilled within the limits of an oil pool yield enough oil to make them paying investments.

"Pools vary greatly both in size and in yield. Some are so small that only an acre or two of land is productive. Others may be as much as 25 miles long and 5 miles broad, although large pools include barren or dry spots.

"The average pool is probably not more than 2 or 3 miles long and a mile to a mile and a half wide. A small pool may produce not more than 4000 to 5000 barrels of oil. If it yielded less, it would hardly be dignified with the name of pool. On the other hand, the output of a large pool is measured in millions of barrels.

"For a period in 1916 the Cushing field of Oklahoma yielded more than 2,000,000 barrels a month, and some single wells in other countries have yielded between 150,000 and 200,000 barrels a day, although the largest well in the United States produced less than 100,000 barrels a day.

"It is sometimes said that oil occurs below the surface of the ground in some regions just as water does in others. This would mean that a well in an oil region is as likely to strike petroleum as a well in a water-bearing region is likely to strike water—that the oil is distributed in an almost continuous sheet beneath extensive parts of the country. This is not true.

"Another statement frequently heard is that the oil forms an underground 'stream,' and that a lucky location for a well must lie over that 'stream.' Expensive and fruitless drilling has repeatedly shown that such 'streams' of oil do not exist. A belief that is strongly held in some parts of the country is that oil pools are connected—that some channel connects the pools in an oil region. This belief is absolutely disproved by the ranks of barren wells that encircle practically every producing oil pool in the world.

"Another wrong idea is that petroleum occurs in underground ponds or lakes. In fact, prospectuses of some oil companies refer to 'lakes and rivers of oil,' giving the idea of great caverns filled with oil. Not a single such cavern has been found in any oil fields in the United States. Oil is really contained in the tiny openings between grains of sand, in the pores and crevices of a crystalline limestone, or, as in the largest wells, in the comparatively small openings of a very porous rock."

In the *Oil News* the American Petroleum Institute estimates the number of automobiles in use on December 31, 1921, as follows:

"Every indication points to a large increase in the demand for gasoline in the next few years. The probable registration of automobiles in the United States on December 31, 1921, will be 12,000,000 cars, according to an estimate in a report to the American Petroleum Institute. This is a gain of more than 50 per cent. over the present registration of nearly 7,600,000 cars. The report states that there are 300,000 tractors in the United States and that the number is rapidly increasing. The growing number of stationary engines constitutes a further demand which the petroleum industry is called upon to supply. The increase in the number of internal combustion engines, as reflected in the growing number of automobiles in use, is also causing a big demand for lubricating oil."

Oil Possibilities in New Mexico

New Mexico has been a recognized wildcat oil field for more than two years past. Tens of millions of dollars are being spent there and have been spent in a high-pressure search for oil. Of the possibilities of this country and the probability of finding oil in it, John T. Knox of the American Association of Petroleum Geologists read a paper at their meeting at Dallas, of which the following are pertinent excerpts from the complete paper as published in the *Engineering and Mining Journal*:

"Lithologic conditions in southern New Mexico are in some measure analogous to those in the oil fields of the Mexican Coast. The Tamasopo limestone of Mexico is an immensely thick series, and enormous quantities of oil have been produced from the upper beds of this formation. The rock itself is not more bituminous than are many of the Paleozoic limestones of southern New Mexico, and it is reasonable to suppose, if the Tamasopo limestone produced the oil which is found in it, that oil may be found in the Magdalena or underlying limestone in New Mexico.

"In my opinion, the Plateau Province, west of longitude 106 degrees and north of latitude 34 degrees is the most promising region in the State of New Mexico in which to prospect for oil and gas. It is essentially an era of Cretaceous rocks. Pennsylvanian formations outcrop in many places, and Permian and early Mesozoic formations have a more limited distribution, but Cretaceous rocks predominate. When measured over long distances, the sedimentary beds are found to lie flat, or nearly so. Small faults with a moderate throw are numerous, and locally small, well-defined anticlines afford excellent collecting areas for petroleum contained in the deformed beds.

"If oil is found in the Plateau region, it will probably be discovered in Cretaceous rocks, and chances of finding oil in these formations are bright. Great quantities of oil are being obtained from Cretaceous rocks in Wyoming and the Wyoming Cretaceous is similar in all important respects to the Cretaceous of northwestern New Mexico. The Cretaceous areas in the San Juan Basin and the smaller Cretaceous areas northwest and west of Magdalena are probably the most favorable localities in the State.

The oldest rocks found in the district around Magdalena are Mississippian in age, and they are exposed over only a limited area. The Pennsylvanian formations are similar lithologically to the Pennsylvanian formations east of the Rio Grande, and the probability of finding oil on structures in the Paleozoic in this district is neither greater nor less than of finding it on structures in the Tertiary-filled valleys of south-central New Mexico. The surface of the Plateau is not everywhere buried under a mantle of Tertiary debris, however, and chances of locating a favorable structure are much better than in the basins to the east and south. The Manzano group is probably considerably thinner than it is in the Rio Grande Valley, and on many structures a well 3500 feet deep would test the lower Pennsylvanian and the Mississippian. Operators who wish to test the Paleozoic horizons in this region should devote careful attention to the areas of Pennsylvanian outcrop around Puerictito and Magdalena.

"Even a brief examination will indicate that the situation in the San Juan Basin closely resembles that in Wyoming. At the base of the Mesaverde is a bed of sandstone nearly 200 feet thick and sufficiently porous in most places to form a good storage horizon. A similar sandstone lies at the top of the Mesaverde immediately underneath the Lewis, and separated from the lower sandstone by a considerable thickness of shale. Even if no oil has migrated downward from the Lewis into the underlying sand, the shale serves as an adequate and impervious seal for the possible oil horizons below.

"Enough oil has been found in the Mesaverde along the south side of the San Juan Basin to encourage further drilling. The Mancos shale may never have produced large quantities of oil, and the overlying sandstones may be barren, but until this has been conclusively proved by several tests drilled on good structures I am inclined to regard the San Juan Basin as the best prospective oil territory in the State of New Mexico."

Oil Shale

The necessity to increase petroleum output has resulted in deep interest in the investigations of scientists and prospectors in the oil-shale beds of the country, particularly of the

West. That this branch of the petroleum industry has many difficult problems before it is well recognized. Some of these problems are set forth by Martin J. Gavin, Refinery Engineer of the Bureau of Mines, in a special interview in the *National Petroleum News* for July 21, in which Mr. Gavin said, in part, as follows:

"The development of an oil-shale industry to one of considerable importance in this country will require the expenditure of many millions of dollars and take a period of many years. Such development will require much research and technical study, and it will also require the services of trained executives and experienced technicians. Nevertheless, when economic conditions become favorable it is reasonable to believe that our oil shales will be of great value as a source of oils similar to those now derived from petroleum. An idea of what large-scale development of the oil shale industry involves may be gained from the consideration that to produce one barrel of crude oil from shale, on the average at least one ton of a tough rock must be mined, crushed, heated to a relatively high temperature, and finally the residue, amounting to about 75 per cent. of the original weight of the raw shale, must be disposed of as valueless.

"Oil shale contains little or no oil as such, but it contains substances which when the shale is subjected to destructive distillation yield gas, crude oil, and nitrogen-containing compounds, notably ammonia, as well as other products in small and probably of unimportant value for the most part. Oil shale, as a rule, must be mined much as coal is mined, crushed, and heated to a relatively high temperature in closed retorts, which may operate continuously or intermittently. These steps are necessary to produce the gas, crude oil, and ammonia, the latter of which is in solution in the water obtained along with the oil.

"The ammonia water is then distilled and the released ammonia passed into sulphuric acid, producing ammonia sulphate. The crude oil must be refined, much as petroleum is refined, to produce the various commercial products. The refining of shale oil is more complex and in all probability more costly than the equivalent refining of petroleum. However, undoubtedly the shale oils can be refined and can be made to yield many products similar to those produced when petroleum is refined. The oils produced from the oil shales of this country will yield gasoline, burning oils, and paraffin wax, all of which, when properly treated, will undoubtedly be satisfactory commercial products. Whether the more viscous grades of lubricating oils, such as lubricants for internal-combustion motors, can be produced from shale oils is doubtful, but it may be

possible to do so. Little is known in this country as to the refining of shale oils at the present time, and this statement can be applied generally to the possibilities and technique of oil-shale operations in the United States."

But the fact that oil shale production has been a proved commercial success in Great Britain and in Scotland for more than 50 years should not be overlooked, and it has not been overlooked by far-seeing American investigators.

A few weeks ago Dr. Victor C. Alderson, president of the Colorado School of Mines, who has long been actively interested in the development of the oil-shale industry of this country, talked in the office of The American Mining Congress en route to Europe on a tour of investigation of European methods of oil-shale production and distillation, particularly those in use in Scotland.

The *Petroleum Times* of London, England, in its issue of June 19 has the following to say concerning Dr. Alderson's visit to Europe:

"Dr. Alderson is paying a brief visit to this country in order to become acquainted on the spot with the shale-oil resources of the United Kingdom and the methods which are being utilized in order to commercially develop our home oil resources.

"The doctor is recognized as the leading authority on oil-shale matters in the United States, and known as the father of the oil-shale industry there. He is also the author of the first book on America's oil-shale industry (now in the press) and chairman of the oil-shale section of The American Mining Congress.

"The Colorado School of Mines has taken a very keen interest in the great variety of minerals which are found in immense quantities throughout the State, but in none more so than in regard to the State's deposits of oil shale, which cover an area of some 5000 miles.

"So far no commercial plants are in operation for the treatment of shales, but a number are under construction, and some of these will probably be in operation during the summer.

"Dr. Alderson attaches the greatest possible importance to the future development of these shale deposits, in view of the steady depletion of America's liquid oil reserves, combined with the ever-increasing demand throughout the world for petroleum products.

"That their commercial operation will be very successful, from a financial point of view, is emphasized by the doctor, for, quite apart from the numerous valuable by-products which can be obtained by the retorting of the shales and the refining of the crude oil, the

oil itself can, he urges, be produced in open competition with the liquid oil. For instance, today Pennsylvanian crude is commanding \$6.10 at the wells and Mid-Continent crude \$3.50 per barrel.

"The Colorado shales can be mined very economically, for in many places the deposits outcrop to great depths alongside the ravines throughout the State. He estimated that \$1.25 per ton is a very outside cost for mining the shale per ton, while another 60 cents will cover all costs connected with the retorting of the shales. The oil content of the Colorado shale varies considerably, and in the richest seams as much as 60 gallons per ton can be produced. Dr. Alderson, however, is conservative, and as a basis for calculation takes one ton of shale as producing one barrel of crude oil—42 gallons.

"The cost in connection with the production of this crude in the Colorado shale fields works out as above detailed at \$1.85—a figure which is considerably below that which the inferior grades of crude command today.

"Questioned in regard to the extent to which the Colorado shale deposits can replace the present output of America's oil wells, Dr. Alderson has come to the conclusion that there is sufficient shale in the Colorado deposits alone to supply almost unlimited wants for an indefinite period of time. On the basis of the above calculation, one 10-ft. seam of Colorado shale will give almost 15,500,000 barrels of oil to the square mile, or seven times as much as is contained in each acre of good oil lands.

"As Dr. Alderson explains, however, this great development is for the future. At the moment, matters are in the experimental stage, and in this connection a great work is being done by the Colorado School of Mines. The necessity for those at the head to be thoroughly conversant with up-to-date shale mining and retorting practice in other parts of the world is a matter of the greatest importance, and this is the main reason for the visit to this country of Dr. Alderson, who hopes to be able to make a careful study of developments, not only in the Norfolk shale fields, but also in Scotland, where, as is known, the oil-shale industry has been on a commercial basis for over half a century."

Coal By-Products as Gasoline Substitutes

Possibilities of other substitutes for the precious gasoline have also been recognized in wide investigation. Alcohol, which is produced by the large industrial alcohol companies, has long been looked at as a possible substitute for gasoline. Concerning the possibility of development of the use of industrial alcohol, and particularly alcohol made in small plants designed to consume the waste material of farms and rural districts, many

difficulties remain to be overcome, according to J. L. Lewis, Petroleum Technologist of the Bureau of Mines, in a statement in the *National Petroleum News* for July 7, in which he says, in part, as follows:

"A considerable quantity of gasoline substitutes is now being obtained from by-product coke ovens. It is expected that 95,000,000 gallons of benzol will be produced in 1920, which will be about 2 per cent. of the total gasoline supply for the year. Everything should be done to encourage and foster this industry. Still larger quantities of gasoline substitutes can be made by retorting coals and lignites which are now being consumed as they come from the mines. If the available oils could be extracted from every ton of coal and lignite before they were consumed, it would add very greatly to the supply of motor fuel.

"The production of benzol from coals is likely to be inseparable from the utilization of alcohols from vegetable matter, which you hope may be a solution of the motor-fuel problem. It is a fact that the present gasoline-using engine cannot use straight alcohol satisfactorily; also, it is going to be practically necessary that any substitute for gasoline as an engine fuel must be practically interchangeable with gasoline. To accomplish this purpose it is necessary to blend alcohol with gasoline. But alcohol will not blend with gasoline unless there is a considerable quantity of benzol or a similar product in the mixture. Therefore, unless some other solution of this problem is found it will be necessary to produce large quantities of benzol from coal in order to blend the alcohol with gasoline and make it an interchangeable fuel.

"At the present time but a comparatively small amount of alcohol produced from sugar refinery wastes is being placed on the market on competition with gasoline. This is being sold as alcohol, benzol, ether and gasoline blends. However, the quantity of alcohol obtainable from sugar refineries is negligible compared with our gasoline needs.

"It is true that there are immense quantities of waste vegetable matter throughout the country, and were it possible to gather the refuse from the farms and from the lumber camps and other places, a tremendous quantity of alcohol could be obtained. But it is unfortunately true that this waste vegetable matter is widely scattered and in few places is it concentrated enough that it seems commercially feasible to make alcohol in competition with gasoline.

"From a quantitative standpoint, petroleum, coal and oil shale are likely to be the cheapest raw material for making gasoline substitutes."

We can increase the production of gasoline substitutes by increasing the production of benzol as a by-product of coke plants.

Alcohol can be produced in unlimited quan-

tity, but to be used to advantage as fuel must be blended with benzol. If the total benzol production for last year had been used for blending to best advantage, a total of half a billion gallons of gasoline substitute would have been available. Not a large percentage of the 15,000,000,000 gallons delivered by refineries, it is true, but to load tank cars with 5,000,000 gallons of gasoline substitute would take 1000 trains of 60 tank cars to the train, each tank car loaded to 8000 to 10,000 gallons capacity—an amount not to be slightly considered.

Great Britain is making tests in the possibility of the use of gasoline substitutes according to the *Oil News*, which says:

"The high prices and increasing demand for gasoline have led to experiments in England for a suitable substitute motor fuel. Recent tests carried out by the London General Omnibus Co. appear to have resulted in interesting conclusions of utilitarian character, while the British Government is now conducting wide researches to discover a liquid fuel that will combine satisfactory features from both a scientific and a practical viewpoint.

"Some time ago omnibuses were successfully run in Paris on a mixture of benzol and alcohol. Benzol being a coal-tar product resulting from fractional distillation and usually extracted or 'washed' from coal or household gas, the supplies of benzol are dependent on the supplies of bituminous coal and habitually contingent on the good-will of the gas companies. However, the alcohol used is extracted from vegetable matter, and consequently there is no limit to the available supply. The experiments have, therefore, contemplated a liquid fuel containing as large a proportion of alcohol as possible. Nevertheless, it appears that neither benzol nor alcohol burns so quickly as gasoline, and the use of a mixture necessitates the structural modification of the ordinary gasoline engine.

"The salient points arising from the investigations that are now complete are that the possible thermal efficiency increases with the increased proportion of alcohol in the fuel for the same compression; that a high proportion of alcohol means also that the compression can be raised, with a consequent rise in the thermal efficiency; and that, so far as the engine is concerned, the bad effects on valve pockets are more marked at small throttle openings with high than with low compression.

"The successful tests were carried out on omnibuses fitted with special engines, having pistons that gave a compression of about 123 pounds per square inch."

Water Power

In casting about for a substitute for coal we hit upon fuel oil; and in casting about for a substitute for fuel oil the possibilities of electrical development are apparent. Why is this not one of our greatest possibilities, not only for stationary power, but for power transportation, even in small units, such as motor cars.

A motor corporation, headed by a famous engineer, is about to produce a motor car run by charged electric battery which has a range of 150 miles without recharging, and whose batteries weigh two-thirds less than any heretofore made. With abundant, cheap electrical power furnished by large turbine engine and water-power units throughout the United States, such transportation would be noiseless, cleanly, efficient, cheap and permanent. On this the *Mining and Oil Bulletin* of July, 1920, has the following to say:

"Power is the greatest need of the world today. The people of the world depend upon power to operate the machinery and drive the wheels of industry needed to aid the production of the necessities of life on a scale vast enough to cope with the demand.

"The West is more fortunate than other sections of the United States. While lacking coal, and while required to release its supply of oil for use in parts outside the State, great power resources exist in the streams, snows and waterfalls of its mountains, which form the great backbone of the West.

"The development of these power resources, the installation of great hydro-electric generating plants, the utilization of the electric power thus generated in more extensive operations in mining, agriculture, industry and manufacturing of all kinds, must be speeded up and given every possible impetus if we are, with anything like characteristic initiative or adequate effort, to help meet the situation in which the world finds itself today.

"With the passage of the Water-power Act, and its approval by the President, it is no idle dream to anticipate the development of the water-power resources of the West to their fullest possible extent; to the efficient and economical distribution of the electric power generated, and, ultimately, to the complete electrification of our homes, ranches, factories, mines and oil wells, railways and railroads. We will pass from the oil age to the age of electricity."

Further interesting comment on the largest development of water-power in the United States is in the *Magazine of Wall Street*. Any-

one who has seen the mammoth turbines at Niagara Falls and the wonderful power resources that they develop cannot but be hopeful for the development of all water-power in the United States:

"Where the tunnel begins, about a mile and a half above the Falls, are two power-houses, built of stone, like fortresses. Here is constructed a surface canal and under the power-houses are the wheel pits, at the bottom of which are installed the turbines. The water passes from the canal direct to the turbines, through immense steel penstocks, causing them to revolve at high speed. By means of shaft connection between these turbines and the generators the electric current is generated. In these two power-houses are 21 units of power, each generating 5000 horse-power, or 105,000 horse-power in all. This is but one of the five power plants now operating at Niagara Falls, and this development is but a fraction of the power of the Falls, which, it is estimated, is capable of developing 5,000,000 horse-power.

"One hundred million tons of water flows over the brink of Niagara Falls every hour. At the crest of the Horseshoe Falls, on the Canadian side of the river, the water even now, when so much water is being diverted for power purposes, flows over with an unbroken flow 14 feet deep. Engineers have figured out with considerable exactitude that 58,000 barrels of water go over the Falls every second.

"To get this within the easy comprehension of the human mind, let us assume that these 58,000 barrels of water represents an equal amount of gasoline. It is not hard to imagine the power that this amount of gasoline can exert when brought into force by an explosive spark. Imagine, then, the power that is now going to waste over Niagara Falls, for in the abrupt drop of 158 feet this water, if harnessed and made to whirl an electric dynamo, will exert something of the same force that will the 58,000 barrels of gasoline.

"Today it is estimated that the total horse-power produced by electric motors is approximately 9,000,000 horse-power. Back in 1890 it was less than 20,000 horse-power.

"There are many great chemical factories, a large plant producing calcium carbide, factories producing caustic, bleach, chlorine, etc. It is a novel, a unique industrial community where secret processes are the vogue, and all have electricity as a basis.

"Those who have grown enormously rich out of Niagara Falls power, and there are many such, are not the men who backed the power plants, but the concerns that came in and adapted the product of the power plants to the manufacture of their products."

German Metallurgical Press Control

Controlled publications of any character are dangerous, but controlled technical and trade journals are particularly vicious.

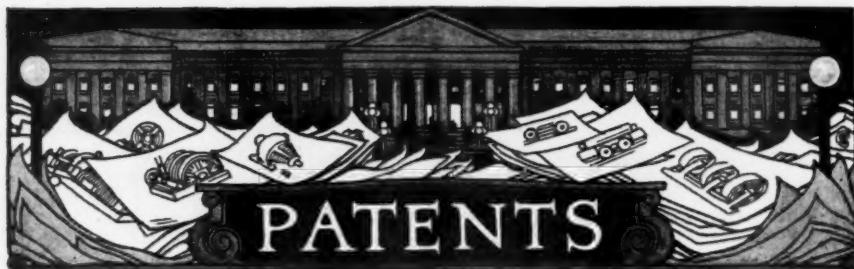
The new group of interests in Germany whose activities in the control of sources of natural resource have been of recent note in the public press are attempting this through their newspaper trusts, says the *Mining Journal* of London:

GERMAN METALLURGICAL NEWSPAPER TRUST.

"Considerable prominence is being given in Germany to the efforts of German metallurgical interests, notably the Stinnes-Hagenberg group, to obtain control of the press of the country by the wholesale purchase of newspapers and publishing houses. According to the *Hamburger Echo* the Stinnes group, who already own, in addition to several printing and publishing concerns, the *Deutsche Zeitung*, the *Lokalanzeiger*, and the *Tageblatt*, have recently bought the *Munchen Ausberger Abendzeitung*, the *Deutsche Allgemeine Zeitung* (official Government organ), and a daily, published in Dortmund. It is stated that as many as 70 journals published in Berlin and in the provinces will come under the control of Herr Stinnes, who is reported to have secured the necessary supplies of paper by purchasing five cellulose factories. The *Leipziger Neuste Nachrichten* suggests the existence of a close connection between these newspaper purchases and Herr Stinnes' coal interests, and concludes as follows: 'A coal dictatorship in the West will be followed by a corn dictatorship in the East, and between the two Germany will never be anything more than a sort of colony exploited by the Entente, and will never be able to recover her liberty and her national dignity.'"

To meet the need for professional services the Associated Geological Engineers has been reorganized into a specialized organization now known as the Associated Petroleum Engineers.

One of the important departments of the Associated Petroleum Engineers, in keeping in touch with petroleum developments and possibilities throughout the world, so as to give the best service to clients, is its library. Its data already cover the United States intensively and the world extensively. In addition to the array of books and publications properly forming a part of every complete library, its contents include a card catalogue of about 10,000 subjects relating to petroleum geology and engineering, 6000 well logs filed by localities, all important geological and topographic maps, and a comprehensive file of clippings and miscellaneous data on oil and its prospects throughout the world.



CONDUCTED BY JOHN BOYLE, JR.

1,341,686—Russell Thayer, Philadelphia, Pa.
Process of Extracting Platinum and similar metals from their sands and ores, consisting in commingling therewith a halogen of an alkali metal; subjecting the charge to the action of heat to volatilize the metal and then collecting the volatilized metal.

1,341,734—Niels C. Christensen, Salt Lake City. Assigned $\frac{1}{2}$ to J. E. Barlow, Havana, Cuba, and $\frac{1}{2}$ to Big Indian Copper Co.

Method of Obtaining a Concentrated SO₂ Solution.

1,341,770—William W. Wilson, Los Angeles.
Apparatus for Mineral Separation.

1,341,786—C. J. A. Dalziel, London, England.
Process of Recovering Copper from Its Ore, consisting in treating the finely crushed ore with an acid solution so as to produce a flowable pulp, aerating and agitating the same, passing the pulp through a series of electrolytic cells, while preventing sedimentation by introducing a blast of air at the lower part of each cell and continually discharging the barren pulp from the last cell.

1,341,800—Frederick A. Eustis, Milton, Mass.

Preparing Fine Ores for Simtering, comprising making the ore into a filter cake, and sticking finely divided particles of fuel to the outside surface of the filter cake.

1,341,808—H. W. Gendar, Lost Hills, Cal.
Oil Well Meter and Sampler.

1,341,901—C. R. Hayward, F. O. Stillman and H. M. Schleicher, Boston, Mass. Assigned to Moa Iron & Development Corp.

Treatment of Iron Ores containing aluminum, nickel, manganese and chromium, comprising subjecting the ore to a sulfatizing roast, then leaching, then evaporating the

liquor, leaving dried sulfate salts, and roasting the dried sulfate salts to produce oxides of the contained metals.

1,342,115—Thomas A. Janney, Garfield, Utah.
Flotation Machine, comprising an agitation vessel for the ore pulp, a separating box communicating with said vessel through upper and lower ports, agitating means for causing a circulation of pulp from the vessel to the box through the upper port and back to the vessel through the lower port, and means for introducing air in a finely divided condition into the ore pulp in the separating box.

1,342,567—Samuel G. Musser, Los Angeles.
Amalgamator.

1,342,651—H. W. Squires, Amityville, N. Y. Assigned to Research Corp.

Electrical Precipitator for the treatment of gases, comprising a pair of sloping electrodes defining a passageway for the gas substantially circular in cross section.

1,342,741—David T. Day, Washington, D. C.
Process of Extracting Oils from Shale, consisting in introducing hot gases of combustion into an opening in the earth and into contact with the shale, vaporizing and collecting the hydrocarbons.

1,342,804—William E. Greenawalt, Denver, Colorado.
Metallurgical Process.

1,342,917—S. C. Lane, Los Angeles, Cal.
Multiple Process Chilian Mill.

1,343,041—William De Coursey, San Francisco, Cal.

Combined Ore Grinder and Amalgamator.

1,343,123—Rudolph Gahl, Miami, Ariz., and **Robert M. Haskell**, Lake Linden, Mich. As-

signed in part to Pneumatic Process Flotation Co.

Ore Flotation Apparatus provided with a chamber having a well made of elastic material and provided with fine openings therethrough and means for introducing fluid under pressure into said chamber.

1,343,153—*A. A. Ossa*, Valparaiso, Chile.

Process of Extracting Copper, consisting in leaching the oxide ore with sulphuric acid; precipitating the copper as iodide by means of hydriodic acid in presence of sulfur dioxide and regenerating hydriodic acid from the iodid precipitate.

1,343,266—*B. A. Hughes*, Colorado Springs, Colorado.

Ore Concentrating Table.

1,343,285—*Walter A. Schmidt*, Los Angeles. Assigned to International Precipitation Co.

Electrical Precipitator for gases, comprising a longitudinal ionizing part, a charging electrode and a collecting field surface member substantially parallel to the ionizing part.

1,343,313—*Samuel H. Dolbear*, San Francisco. Assigned to Minerals Separation North American Corp.

Flotation Process and Apparatus, involving subjecting a column of liquid containing the ore to gasification in such manner that gas in the form of bubbles will rise upward in the liquid and become attached to floatable material, and then diverting such bubbles from the column into a gaseous medium at a point where the pressure in said column is greater than in the gaseous medium.

1,343,360—*A. E. Knee*, Bluefield and *G. B. Hopkins*, Lex., W. Va.

Mechanical Long Wall Coal Loading Conveyor.

1,343,482—*W. A. Schmidt* and *G. C. Roberts*, Los Angeles. Assigned to International Precipitation Co.

Electrical Precipitator.

1,343,497—*Charles W. Eccleston*, Los Angeles.

Rifled Pneumatic Concentrating Table for the separation of comminuted material, comprising a top of elastic material having fine punctures therein and means for supplying compressed air to the underside of the sheet to open the punctures, so that the material is subjected to a gravitational action according to the difference of pressures on each side of the top.

1,343,619—*J. O. Elton*, Great Falls, and *R. B. Caples*, Cascade, Mont. Assigned to Anaconda Copper Mining Co.

Process of Treating Impure Zinc Sulfate Solutions, containing copper and cadmium, comprising precipitating copper and cadmium therefrom by zinc in excess and separating the residue from the purified solution; treating the residue with sulfuric acid proportioned to dissolve substantially all of the zinc and cadmium while leaving the copper substantially undissolved; and precipitating cadmium from the solution by means of zinc.

1,343,683—*M. L. Rogers*, Johannesburg, Cal. Concentrator.

1,344,051—*Alfred R. Mackie*, Lander, Wyo. Concentrator.

1,344,123—*E. W. Engelman* and *W. T. McDonald*, Hayden, Ariz.

Flotation Apparatus, comprising a cell having impervious concrete sides and a porous concrete top.

1,344,127—*William E. Greenawalt*, Denver, Colorado.

Metallurgical Process, consisting in treating mixed sulfid and oxid ores of copper with a solvent for the oxidized copper, applying a flotation agent to the ore pulp, electrolyzing the ore pulp at a current density sufficiently high to give a loose deposit of copper, and floating the metallic copper produced by the electrolysis and the sulfid mineral with gases liberated by the electrolytic action.

1,344,201—*Chas. E. Davis*, Chicago, Ill. Assigned to Goodman Mfg. Co.

Mining Machine, comprising a frame, a cutter chain, a chain guard slidably engaging the frame, said frame provided with a receiving space for the guard, said guard adapted to move back into the space as the chain moves forward, the mining machine being supported on the mine floor independently of the chain guard.

1,344,370—*Charles Allen*, El Paso, Tex.

Automatic Density Indicator for Slime Pulp Separators.

1,344,681—*C. J. A. Dalziel*, London, England.

Process of Extracting Metals, comprising leaching and electro-deposition.

1,344,074—*William Crooks*, Aldrich, Ala.

Automatic Mine Door Operating Mechanism, comprising a pair of laterally moving sliding doors, side anchors and divergent telescoping arms connected at one end to the pair of doors and at the other end to said side anchors.



DECISIONS OF THE INTER-STATE COMMERCE COMMISSION

Rate Advances

The Interstate Commerce Commission is expected to hand down in the very near future a decision providing for increases in all railroad charges necessary to bring the income of the carriers up to the level prescribed in the Transportation Act. Since the hearings in this matter were concluded, the Railroad Labor Board has awarded approximately \$600,000,000 as an increase in wages; and the carriers have petitioned the Commission to include an increase with the general one previously asked for, which will take care of this increase in wages. The amounts necessary are: In official territory 10 per cent, and in Southern and Western territory approximately 8½ per cent. on freight rates. It is also proposed to increase passenger rates 20 per cent., and to put a sur-charge on Pullman fares for the benefit of the railroads, this charge to be 50 per cent. of the rate. Added to the increases previously asked for, this will mean an increase of 33½ per cent. in the total freight revenues of the country. The eastern section will require more than the South and West.

Car Service

Considerable interest was manifested in the Commission's hearings in Ex Parte No. 75, which had to do with the supply, exchange, interchange and return of open-top equipment within the territory east of the Mississippi River. Following these hearings, the Commission issued Service Order No. 9, which modifies Service Order No. 7, previously in effect. The new order extends the life of the requirements from 30 to 60 days from June 1, 1920. It also requires the unloading of coal or other freight in coal cars within 24 hours, and gives preference and priority to public utilities and institutions.

Service Order No. 10 provides for the shipment to the Northwest of a sufficient amount of coal to meet the requirements of that section prior to the close of navigation; and this coal is being sent through a pool directed by

H. M. Griggs, manager of the Ore and Coal Exchange at Pittsburgh.

Service Order No. 11 provides for the shipment of coal to tidewater coal trans-shipment piers at and north of Hampton Roads, Va., for trans-shipment by water to New England. The purpose of this order is to relieve the New England situation; and it is being handled through coal pools at the various tide-water points.

The Commission has notified all carriers that they must not confiscate coal consigned to the War Department or other Government departments.

Earnings

The final figures for the month of April show that all carriers in the United States sustained a deficit of over \$25,000,000, as compared with an income last year of \$28,000,000. The Eastern district bears \$20,000,000 of this deficit, and the Western district over \$6,000,000. The Southern district had an income of \$1,500,000. This poor showing is undoubtedly due to a large extent to the numerous strikes that were in effect throughout the country during April. For the four months ended with April the income for all carriers is approximately \$52,000,000, as compared with \$75,000,000 for the same period last year.

Decisions of the Interstate Commerce Commission

Coal.—In a case brought by the Wholesale Coal Trade Association of New York, the Commission has found demurrage charges on tidewater coal not unreasonable from November 11, 1918, to March 2, 1919, but during the balance of March they were unreasonable, and reparation has been awarded. In the same opinion, the monthly period for adjusting credits and debits was not found unreasonable, and tidewater regulations were declared not unduly prejudicial to small shippers. The record as made up did not justify the departure from the general rule with respect to denying relief from demurrage charges during strikes.

The combination rates on bituminous coal in carloads from Christopher and West Frank-

fort, Ill., to West Allis, Wis., were found unreasonable, and reparation was awarded to the Old Ben Coal Corp.

Rates of \$1.10 per gross ton on bituminous coal from Snow Shoe, Grass Flat, Munson and Hawk Run districts in Central Pennsylvania via New York Central and Pennsylvania to Lock Haven, Pa., not found unreasonable or otherwise unlawful in a complaint by the New York and Pennsylvania Company.

Petroleum.—In a complaint of the Atlantic Refining Co. the Commission found rates on petroleum naphtha from Crichton, La., to Pittsburgh, Pa., unreasonable to the extent that they exceeded the aggregate of intermediate rates, and reparation was awarded.

Rates on gasoline and lubricating oil, in tank carloads from Port Arthur, Tex., to Memphis, Tenn., found not unreasonable in a case brought by the Gulf Refining Co. of Louisiana.

Rates on fuel oil, carloads, from points in Kansas, Oklahoma, Missouri and Arkansas to Keokuk, Iowa, found unreasonable and unduly prejudicial, and reparation on some shipments awarded to the J. C. Hubinger Brothers Co.

In a complaint of the Montana Oil Co. the rate on petroleum and its products, carloads, to points in Montana from points in northern Oklahoma found not unreasonable, but unduly prejudicial to the extent it exceeds the rate contemporaneously in effect from Kansas points to the same destinations, and like rates from southern Oklahoma found unduly prejudicial to the extent that they exceed the rate contemporaneously in effect from northern Oklahoma and Kansas points to Montana points by more than the differentials currently in effect on like shipments from southern Oklahoma points on the one hand and northern Oklahoma on the other to Kansas City, Mo., but not to exceed 5 cents per 100 pounds.

Investigation and Suspension Cases

In Docket No. 1190 a proposed cancellation of the existing fabrication-in-transit privilege at St. Louis based on through rates from point of origin to destination plus an additional charge of 1½ cents per 100 pounds, in connection with shipments of structural iron and steel originating at Chicago, Ill., Gary, Ind., or at points east of the Indiana-Illinois State line and destined to Memphis, New Orleans and certain other Mississippi Valley points, has been suspended and will be investigated.

In Docket No. 1191 the Commission has suspended and will investigate a rule proposed by Agent Gomph in his I. C. C. No. 378, which provides that freight charges on traffic from points in the United States to points in Canada must be paid in United States currency.

Tentative Reports

Docket No. 11274—Wharton Steel Co. v. Director-General and Central Railroad Co. of New Jersey.

A tentative report in this case has been proposed by Examiner W. H. Wagner, the syllabus of which is as follows:

"Demurrage charges assessed on cars containing *ore* frozen in transit not shown to have been illegal, unreasonable or otherwise unlawful. Complaint dismissed."

Docket No. 11169—National Fireproofing Co. v. Director-General, Pennsylvania Company et al.

A tentative report in this case has been proposed by Examiner G. H. Mattingly, the syllabus of which is as follows:

"1. Complainant's prayer for the establishment of joint rates on *coal* in carloads from points in the Mercer-Butler and Pittsburgh districts of Pennsylvania denied.

"2. Applicable combination rates found not unreasonable and complaint dismissed."

Docket No. 10848—Oklahoma Producing & Refining Corp. of America v. Director-General, Chicago & Eastern Illinois Railroad Co. et al.

A tentative report in this case has been proposed by Examiner H. B. Armes, the syllabus of which is as follows:

"Rates on *petroleum and its products*, in tank carloads from Warren, Pa., St. Marys, W. Va., and Chicago Heights, Ill., to Muskogee, Okla., found not to have been or to be unreasonable, but that they were and are unduly prejudicial to the extent that they exceeded or exceed the corresponding rates contemporaneously maintained to Tulsa and Wagner, Okla. Reparation denied."

Docket No. 11304—American Smelting & Refining Co. et al. v. Director-General, Baltimore & Ohio Railroad Co. et al.

A tentative report in this case has been proposed by Examiner W. H. Wagner, the syllabus of which is as follows:

"Demurrage charge and free time at Baltimore, Md., on carload shipments of coke for export not shown to have been unjust or unreasonable between February 10 and December 31, 1918. Complaint dismissed."

Released Rates Orders

The Commission has issued numerous orders allowing the carriers to publish rates dependent upon value declared in writing by the shipper or agreed upon in writing as the released value of the property.

The numbers of these orders, together with their application, are shown below:

No. 122—Ore and Smelter Products between Points in Colorado as shown in Atchison, Topeka & Santa Fe Railway Co. Tariff No. 5888-1, I. C. C. No. 8455.

No. 123—Ore, Concentrates, Matte, Copper and other Smelter Products between Points

in Arizona, California and Nevada as shown in Atchison, Topeka & Santa Fe Railway Co. Tariff No. 5881-F, I. C. C. No. 6323.

No. 124—Ore and Concentrates, in Carloads, from Points on Eureka Nevada Railway to Palisade, Nev.

No. 125—Ore, Concentrates, Matte, Copper Products, etc., from Points in Arizona, California and New Mexico to various Destinations as shown in Atchison, Topeka & Santa Fe Railway Co. Tariff No. 5746-G, I. C. C. No. 8285.

No. 127—Ore, Concentrates, Matte and Copper Products, in Carloads, from Cox and Brown's Spur to Blythe Junction, Cal.

No. 128—Ore, in Carloads, from Deming, N. M., to Florence, Colo.

No. 129—Ore and Concentrates, in Carloads, from Magdalena, Kelly, Hurley, Santa Rita, Fierro and Silver City, N. M., to Sasco, Ariz.

No. 130—Ore and Copper Matte, in Carloads, from Stanley, Clark, Magdalena and Deming, N. M., Pueblo, Colo., and El Paso, Tex., to El Paso, Tex., Stanley and Waldo, N. M., Pueblo and Canon City, Colo.

No. 131—Lead Matte, Containing Copper, in Carloads, from Needles, Cal., to Omaha, Nebraska.

No. 132—Ores, Concentrates, Sulphurets, Matte and Bullion from El Paso, Tex., Denver and Pueblo, Colo., and points in New Mexico, to points in Colorado, Illinois, Indiana, Missouri, New Mexico, Oklahoma and Texas, as shown in Atchison, Topeka & Santa Fe Railway Co. Tariff No. 5805-G, I. C. C. No. 8349.

No. 133—Ore and Concentrates, in Carloads, between Points in New Mexico and stations on the El Paso and Southwestern system.

No. 134—Ore and Concentrates, in Carloads, from Points in New Mexico and Arizona; also Needles, Cal., on Atchison, Topeka & Santa Fe Railway Co., to Blende, Colo.

No. 135—Ores and Concentrates, in Carloads, from Needles and Ivanpah, Cal.; also points in Arizona and New Mexico, to Points in Arkansas, Illinois, Kansas, Missouri, Nebraska and Oklahoma as shown in Atchison, Topeka & Santa Fe Railway Co. Tariff No. 6644-P, I. C. C. No. 8165.

No. 136—Zinc Lead Flue Dust, in Carloads, from Canon City, Colo., to Chicago, Chicago Heights, South Chicago and East Joliet, Ill., Gary and Hammond, Ind., and Coffeyville, Kansas.

No. 137—Copper Matte, in Carloads, from Stanley, N. M., to Omaha, Neb.

No. 141—Ores, Concentrates and Sulphurets, in Carloads, from Courtland, Gleeson, Pearce and Servoss, to Clifton, Ariz.

No. 143—Ores, in Carloads, between Points in Oklahoma and Points in Colorado as shown in Atchison, Topeka & Santa Fe Railway Co. Tariff No. 5681-G, I. C. C. No. 8444.

PERSONALS

W. J. Loring of San Francisco, who has been in Washington on business for several weeks, has returned to California.

Judge John A. Davis of San Francisco is in Washington before the War Minerals Relief Commission representing California claimants.

Dr. R. C. Allen, vice-president of the Lake Superior Iron Ore Association, was a caller at the offices of the Mining Congress during the month.

Carl Scholz of Charleston, W. Va., a director of The American Mining Congress, spent two days in Washington, where he attended the meeting of the National Coal Association and conferred with the Secretary of the Mining Congress on affairs of importance.

Bulkeley Wells, president of The American Mining Congress, arrived in New York July 18, where he will remain until September. He is stopping at the Knickerbocker Club and is transacting business at the usual place, 120 Broadway.

John T. Burns, assistant secretary of The American Mining Congress, left Washington August 1 for Denver to open convention headquarters at the Albany Hotel, where he may be reached until further notice. The convention will be held in Denver November 15-19.

J. D. Burgess, who has been general manager of the United Eastern for the Keith-Wiseman-Jackson interests, has tendered his resignation to take effect this month. There will be no successor to that position, although Roy Moore, who has been assistant manager, will be retained with the title of general superintendent. It is understood that Mr. Burgess has formed an alliance with a mining engineering firm of San Francisco and will make his home in that city.

G. H. Caperton has been appointed treasurer of the Smokeless Coal Operators' Association of West Virginia.

Frank L. Hess of the United States Geological Survey has returned to Washington after several months spent in South America in the interest of the Guggenheims. He will resume his work at the Survey at an early date.

The Quincy Mining Co., 32 Broadway, New York, has announced the removal of their offices to 52 Broadway.



"Yes, Mr. Brown, that's our repair shop!"

THIS handy, movable oxwelding and cutting unit paid for itself many times over the first month we had it.

"We used to give a lot of floor space to repair work and we had a sizeable stock-room for spare parts—now this little Oxweld outfit and one man can handle all jobs, big and little, with scarcely any loss of time.

"It prevents breakdowns, too, by building up worn parts, axles, shafts, gear-teeth and the like—before they cause trouble.

"And as a production cost-cutter, Oxweld is invaluable."

Hundreds of manufacturers throughout America have profited by Oxweld Engineering Service.

Why not ask one of the fifty centrally located Oxweld Service centers to help you with your own problems? Or better still, write or telephone to any of the addresses below for immediate attention.

OXWELD ACETYLENE COMPANY

NEWARK, N. J. CHICAGO

SAN FRANCISCO

*World's largest maker of equipment
for oxwelding and cutting metals*

0-528

BUYERS' DIRECTORY

INDEX

ACID, SULPHURIC

Irvington Smelting & Refining Works, Irvington, N. J.

AERIAL TRAMWAYS

American Steel & Wire Co., Chicago and New York.

AIR COMPRESSORS

Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Hendrie & Bolthoff Mfg. & Supply Co., Denver, Colo.

AMALGAMATORS

Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Mine & Smelter Supply Co., Denver, Colo.

Mine Equipment & Supply Co., Denver, Colo.

ARMATURES

Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.

ARCHITECTS

Shourds-McCormick Co., Inc., Terre Haute, Ind.

ASBESTOS PRODUCTS

Mikesell Bros. Co., 156 North La Salle St., Chicago, Ill.

ASSAYERS

Indiana Laboratories Co., Hammond, Ind.

Ledoux & Co., Inc., 99 John St., New York.

Lucius Pitkin, Inc., 47 Fulton St., New York City.

Pennsylvania Smelting Co., Pittsburgh, Pa.

W. L. Piers, 428 18th St., Denver, Colo.

Thompson Balance Co., Denver, Colo.

AUTOMATIC CAR CAGERS

Connellsville Mfg. & Mine Supply Co., Connellsville, Pa.

AUTOMATIC COAL SKIP

Jacobsen & Schraeder, Inc., Marquette Bldg., Chicago, Ill.

Roberts & Schaefer Co., McCormick Bldg., Chicago, Ill.

AUTOMATIC (Mine Doors, Truck and Electric Switches)

American Mine Door Co., Canton, Ohio.

Dinwiddie Steel & Mfg. Co., St. Louis, Mo.

BALANCES

Ainsworth & Sons, Wm., Denver, Colo.

Mine & Smelter Supply Co., Denver, Colo.

Thompson Balance Co., Denver, Colo.

BALLS (For Ball Mills)

Mine Equipment & Supply Co., Denver, Colo.

Mine & Smelter Supply Co., Denver, Colo.

BALL MILLS

Hendrie & Bolthoff Mfg. & Supply Co., Denver, Colo.

Mine Equipment & Supply Co., Denver, Colo.

BEARINGS (Roller)

Hyatt Roller Bearing Co., 100 W. 41st St., New York, N. Y.

BELTING (Conveyor, Elevator, Transmission)

Chicago Belting Co., Chicago, Ill.

H. Channon Co., Chicago, Ill.

Goodrich Co., B. F., Akron, Ohio.

Jeffrey Mfg. Co., 958 N. Fourth Avenue, Columbus, Ohio.

Link-Belt Co., 910 S. Michigan Ave., Chicago, Ill.

U. S. Rubber Co., New York City.

BELTING SUPPLIES

Chicago Belting Co., Chicago, Ill.

U. S. Rubber Co., New York City.

Mine & Smelter Supply Co., Denver, Colo.

BINS (Coke and Coal)

Jeffrey Mfg. Co., Columbus, Ohio.

Link-Belt Co., 910 S. Michigan Ave., Chicago, Ill.

BIT SHARPENERS

Denver Rock Drill Mfg. Co., Denver, Colo.

BLASTING SUPPLIES

Atlas Powder Co., Wilmington, Del.

du Pont Powder Co., The E. I., Wilmington, Del.

Equitable Powder Co., East Alton, Ill.

Hercules Powder Co., Wilmington, Del.

Illinois Powder Co., St. Louis, Mo.

BLOWERS

General Electric Co., Schenectady, N. Y.

BOILERS

Allis-Chalmers Mfg. Co., Milwaukee, Wis. (feed pump).

Hendrie & Bolthoff Mfg. & Supply Co., Denver, Colo.

Mine Equipment & Supply Co., Denver, Colo.

BOLTS (Expansion)

Electric Service Supplies Co., 17th and Cambria Sts., Phila., Pa.

BRATTICE CLOTH

H. Channon Co., Chicago, Ill.

Mikesell Brothers Co., 156 N. La Salle Street, Chicago, Ill.

BREAKERS (Construction and Machinery)

Jeffrey Mfg. Co., Columbus, Ohio.

Vulcan Iron Works, Wilkes-Barre, Pa.

Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.

Wilmet Engineering Co., Hazleton, Pa.

BRIDGES

Stupp Bros. Bridge & Iron Co., St. Louis, Mo.

BRIQUETTING MACH.

General Briquetting Co., 25 Broad Street, New York City.

Jeffrey Mfg. Co., Columbus, Ohio.

BUCKETS (Clam Shell)

Link-Belt Co., 910 S. Michigan Ave., Chicago, Ill.

Machinery Warehouse & Sales Co., Old Colony Bldg., Chicago.

Stephens - Adamson Mfg. Co., Aurora, Ill.

BUCKETS (Elevator)

Jeffrey Mfg. Co., Columbus, Ohio.

Link-Belt Co., 910 S. Michigan Ave., Chicago, Ill.

Machinery Warehouse & Sales Co., Old Colony Bldg., Chicago.

Stephens - Adamson Mfg. Co., Aurora, Ill.

CABLES (Connectors and Guides)

American Mine Door Co., Canton, Ohio.

CABLEWAYS

Jeffrey Mfg. Co., Columbus, Ohio.

Lidgerwood Mfg. Co., 96 Liberty St., New York City.

CAGES

Connellsville Mfg. & Mine Supply Co., Connellsville, Pa.

Hendrie & Bolthoff Mfg. & Supply Co., Denver, Colo.

Holmes & Bros., Robert, Inc., Danville, Ill.

Lidgerwood Mfg. Co., 96 Liberty St., New York City.

Mine & Smelter Supply Co., Denver, Colo.

CAGE (Safety Appliances)

Connellsville Mfg. & Mine Supply Co., Connellsville, Pa.

CAR DUMPS

Car-Dumper & Equipment Co., Chicago, Ill.

Jacobsen & Schraeder, Inc., Marquette Bldg., Chicago, Ill.

Link-Belt Co., 910 S. Michigan Ave., Chicago, Ill.

MOTION PICTURES AND THE MINER



Your message on Americanization cannot fail to get across if you put it on the screen—an instrument infinitely more powerful than even the daily press.

Many of the leading mining companies in the Pittsburgh district are using the

GRAPHOSCOPE

as the logical means of allaying unrest among their workers. We will welcome the opportunity of telling you how they are doing it.

UNION ELECTRIC COMPANY

933 Liberty Ave.

Pittsburgh, Pa.

Hockensmith Wheel and Mine Car Co.

(Pittsburgh District) Penns Station, Pa.

Manufacturers of

Chilled Annealed
Mine Car Wheels
Self-Oiling Roller Bearing

Angle Bar Trucks
The Truck for Severe Service

M i n e C a r s
Steel—Composite—Wood

Awarded Gold Medal Panama-Pacific
Exposition for Mine Cars, Wheels
and Oiling System

Catalogue "M" upon request

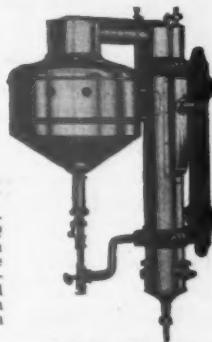
Batteries That Fail

Storage Battery
Efficiency Demands
Pure Water

"The Better the
Still the Better the
Water"

Operated with Gas,
Gasoline, Kerosene,
Steam or Electricity

How many batteries die prematurely?
The failure is often hastened by impure water.
Iron, chlorine and nitrates all increase local action
and the deterioration of the elements.



The GAS OPERATED

Improved Automatic Rochlitz Water Still
automatically supplies a stream of pure distilled
water.

Production costs are a minimum.
Send for figures and testimonials.

Standardized by several hundred mines.

With distilled water on hand you can purchase C. P. Acid and reduce it to proper battery strength, thus saving transportation charges on carbonyl and water.

Manufactured by
W. M. LALOR CO., Manhattan Bldg., Chicago, U.S.A.

MANUFACTURING



THRU SOUTHWEST

United Mining Machinery

Is Based on Actual Experience
in the Fields—and Gives Service

ZINC and LEAD

Complete Mine and
Mill Equipment

Hoists
Screens
Crushers
Rolls
Jig Irons
Elevators
Tables
Cars
Wheels
Pumps, Etc.

COAL

Complete Equipment from
Tipple to Shaft Cars

Cages
Weigh Pans
Hoists
Steam Shovel Parts
Crushers
Cars
Screens
Tipples and Tipple Irons
Pumps
Frogs, Switches, Etc.

SEND FOR "UNITED" CATALOGS

UNITED IRON WORKS, Inc.

General Offices, KANSAS CITY, MO.



General Briquetting Company

CONSULTING ENGINEERS

25 Broad Street

NEW YORK

Specialists in the Briquetting of Ores, Coals,
Lignites, Metals, Concentrates, etc.

BALANCES AND WEIGHTS

for Scientific Purposes

Made by

THOMPSON BALANCE CO.
Denver, Colorado

THE OVERSTROM

Running-in-oil Motion



has the least number of parts and absolutely the best record for long life and efficiency of any motion on the market.

It is interchangeable with the open type motion used on the older makes of Overstrom tables.

THE DEISTER CONCENTRATOR CO.

Manufacturers of the Famous Diagonal Deck Coal Washing and Ore Concentrating Table

Main Office, Factory and Test Plant
FORT WAYNE, INDIANA, U. S. A.

EVERLASTING LINE

Cutter Heads,

Chains,

Guides, etc.

For all makes of
Breast and Shortwall Machines

Send for Booklet

FRANK PROX CO.
TERRE HAUTE, IND.

CONVEYORS AND ELEVATORS

Willis E. Holloway & Co., Cleveland, Ohio.
Jeffrey Mfg. Co., Columbus, Ohio.
Link-Belt Co., 910 S. Michigan Ave., Chicago, Ill.
Stephens - Adamson Mfg. Co., Aurora, Ill.

CONVEYOR MAGNETS

Dings Magnetic Separator Co., 100 Smith St., Milwaukee, Wis.

CONVEYORS, PAN OR APRON

Jeffrey Mfg. Co., 958 N. Fourth St., Columbus, Ohio.
Link-Belt Co., 910 S. Michigan Ave., Chicago, Ill.
Stephens - Adamson Mfg. Co., Aurora, Ill.

CONVEYORS, SCREW

Jeffrey Mfg. Co., 958 N. Fourth St., Columbus, Ohio.
Link-Belt Co., 910 S. Michigan Ave., Chicago, Ill.
Stephens - Adamson Mfg. Co., Aurora, Ill.

CORE DRILLING

H. R. Ameling Prospecting Co., St. Louis, Mo.
Hoffman Bros., Punxsutawney, Pa.
E. J. Longyear Co., Minneapolis, Minn.

COUPLINGS

Nicholson, W. H., & Co., Wilkes-Barre, Pa.

COUPONS

Allison Coupon Co., Indianapolis, Ind.

CRANES

Link-Belt Co., 910 S. Michigan Ave., Chicago, Ill.
Machinery Warehouse & Sales Co., Old Colony Bldg., Chicago.

CRUSHERS

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Pulverizer Co., 18th and Austin Sts., St. Louis, Mo.
Hendrie & Bolthoff Mfg. & Supply Co., Denver, Colo.
Jeffrey Mfg. Co., 958 N. Fourth St., Columbus, Ohio.
Link-Belt Co., 910 S. Michigan Ave., Chicago, Ill.
Machinery Warehouse & Sales Co., Old Colony Bldg., Chicago.
Mine Equipment & Supply Co., Denver, Colo.
Mine & Smelter Supply Co., Denver, Colo.
Stephens - Adamson Mfg. Co., Aurora, Ill.
United Iron Works Co., Kansas City, Mo.

CRUSHERS, COAL

American Pulverizer Co., 18th and Austin Sts., St. Louis, Mo.
Connellsville Mfg. & Mine Supply Co., Connellsville, Pa.
Jeffrey Mfg. Co., 958 N. Fourth St., Columbus, Ohio.
Link-Belt Co., 910 S. Michigan Ave., Chicago, Ill.
Machinery Warehouse & Sales Co., Old Colony Bldg., Chicago.
Stephens - Adamson Mfg. Co., Aurora, Ill.
United Iron Works Co., Kansas City, Mo.

CRUSHER (Proctors)

Dings Magnetic Separator Co., 100 Smith St., Milwaukee, Wis.

CRUSHING PLANTS, COKE

American Pulverizer Co., 18th and Austin Sts., St. Louis, Mo.
Jeffrey Mfg. Co., 958 N. Fourth St., Columbus, Ohio.

CUTTER HEADS

Frank Prox Co., Terre Haute, Ind.

CYANIDE

American Cyanamid Co., New York, N. Y.

DERRICKS AND DERRICK FITTINGS

James H. Channon Mfg. Co., 227 W. Erie St., Chicago, Ill.
Hendrie & Bolthoff Mfg. & Supply Co., Denver, Colo.

DESIGNERS OF PLANTS

Willis E. Holloway & Co., Cleveland, Ohio.
Jacobsen & Schraeder, Inc., Marquette Bldg., Chicago, Ill.

Jeffrey Mfg. Co., 958 N. Fourth St., Columbus, Ohio.
Mine Equipment & Supply Co., Denver, Colo.

Roberts & Schaefer Co., McCormick Bldg., Chicago, Ill.
Shourds - McCormick Co., Inc., Terre Haute, Ind.

Wellman-Lewis Co., Hibernian Bldg., Los Angeles, Cal.

DIAMOND CORE DRILL CONTRACTING

Hoffman Bros., Punxsutawney, Pa.
Longyear Co., E. J., Minneapolis, Minn.

DOORS, AUTOMATIC MINE

American Mine Door Co., Canton, Ohio.

DRAG LINES

Denver Rock Drill Mfg. Co., Denver, Colo.

Machinery Warehouse & Sales Co., Old Colony Bldg., Chicago.

DRIFTERS, DRILL

Denver Rock Drill Mfg. Co., Denver, Colo.

DRILLS (Blast Hole)

Denver Rock Drill Mfg. Co., Denver, Colo.

DRILLS, CORE

Hoffman Bros., Punxsutawney, Pa.
Longyear Co., E. J., Minneapolis, Minn.

DRILLS, ELECTRIC

General Electric Co., Schenectady, N. Y.

Jeffrey Mfg. Co., 958 N. Fourth St., Columbus, Ohio.
Union Electric Co., Pittsburgh, Pa.

DRILLS, HAMMER

Denver Rock Drill Mfg. Co., Denver, Colo.

DRILLS (Hand Operated Coal)

Ohio Brass Co., Mansfield, Ohio.

DRILLS, PNEUMATIC

Denver Rock Drill Mfg. Co., Denver, Colo.

DRILLS, PROSPECTING

Hoffman Bros., Punxsutawney, Pa.
Longyear Co., E. J., Minneapolis, Minn.

DRILLS, ROCK

Denver Rock Drill Mfg. Co., Denver, Colo.
General Electric Co., Schenectady, N. Y.

Pneumeclectric Machine Co., Syracuse, N. Y.
Union Electric Co., Pittsburgh, Pa.

DRILL STEEL SHARPENERS

Denver Rock Drill Mfg. Co., Denver, Colo.

DRUMS (Hoisting, Haulage)

Connellsville Mfg. & Mine Supply Co., Connellsville, Pa.

DRUMS (Magnetic)

Dings Magnetic Separator Co., 100 Smith St., Milwaukee, Wis.

DRYERS, ORE

Allis-Chalmers Mfg. Co., Milwaukee, Wis.

DUMPERS, ROTARY

Car-Dumper & Equipment Co., Chicago, Ill.
Link-Belt Co., 910 S. Michigan Ave., Chicago, Ill.

DUMP CARS

Connellsville Mfg. & Mine Supply Co., Connellsville, Pa.

DYNAMITE

Atlas Powder Co., Wilmington, Del.

du Pont Powder Co., The E. I., Wilmington, Del.

Equitable Powder Co., East Alton, Ill.

Hercules Powder Co., Wilmington, Del.

Illinois Powder Co., St. Louis, Mo.

DYNAMOS

Goodman Mfg. Co., Forty-eighth Place and Halsted St., Chicago, Ill.

Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.

ELECTRICAL APPARATUS

Allis-Chalmers Mfg. Co., Milwaukee, Wis.

General Electric Co., Schenectady, N. Y.

Mine & Smelter Supply Co., Denver, Colo.

Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.

ELECTRICAL ENGINEERS

Stephens - McCormick Co., Inc., Terre Haute, Ind.

ELECTRIC HOISTING MACHINERY

Hendrie & Bolthoff Mfg. & Supply Co., Denver, Colo.

Jeffrey Mfg. Co., 958 N. Fourth St., Columbus, Ohio.

Link-Belt Co., 910 S. Michigan Ave., Chicago, Ill.

What Are You Doing With That Prospect?

Consult with us as to its development. We will contract for all or any part of the work—Developing the prospect; building your mill, cyanide plant, or smelter; roads, trams or railroads; dams and pipe lines. Our engineers have had many years of practical mining experience. Write for estimates.

WELLMAN LEWIS CO.,

900 HIBERNIAN BUILDING
LOS ANGELES, CAL.



O-B Type M-1 Section Insulator Switch
(Patented)

Swivel Boss Added Feature O-B Type M Switches

The new swivel boss on the O-B Type M Section Insulator Switch saves time and simplifies installation. The switch is attached to hangers without removing boss. Slight play takes care of some error in spotting hangers.

Handles now have soft rubber insulation. It's unbreakable.

THE OHIO BRASS COMPANY
MANSFIELD - - - OHIO



AMERICAN FILTERS ARE CAPACITY FILTERS

Their high filtering rate is responsible for their popularity in the mining field. American filter bags are kept open and pliable at all times, reducing the frequency of clogging. American filters are economical in handling concentrates where calcium precipitates are present. Arrange to try out with the equipment you are now using. Write for Bulletin No. G.

UNITED FILTERS CORPORATION
Kelly and Sweetland Pressure Filters American Continuous Filters
Sweetland's Patent Metallic Filter Cloth "United" Filter Presses
65 BROADWAY, NEW YORK
Salt Lake City Los Angeles San Francisco Chicago
Cable Address: "Unifilter" Codes: Western Union Five Letter

The Connellsville Manufacturing and Mine Supply Company

Connellsville, Pa.

If you need any cost reducing
mine equipment, write us.

The Cage, Hoist and Fan Builders

ELECTRIC LOCOMOTIVES

Goodman Mfg. Co., Forty-eighth Place and Halstead St., Chicago, Ill.
Jeffrey Mfg. Co., 958 N. Fourth St., Columbus, Ohio.
Ohio Brass Co., Mansfield, Ohio.
Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.

ELECTRIC MINE SUPPLIES

Electric Railway Equipment Co., Cincinnati, Ohio.
Ohio Brass Co., Mansfield, Ohio.

ELECTRICAL SUPPLIES

Electric Service Supplies Co., 17th and Cambria Sts., Phila., Pa.
General Electric Co., Schenectady, N. Y.
Hendrie & Bolthoff Mfg. & Supply Co., Denver, Colo.
Mine & Smelter Supply Co., Denver, Colo.
Union Electric Co., Pittsburgh, Pa.
Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.

ELECTRO MAGNETIC SEPARATORS

Dings Magnetic Separator Co., 100 Smith St., Milwaukee, Wis.

ELEVATORS

Jeffrey Mfg. Co., 958 N. Fourth St., Columbus, Ohio.
Link-Belt Co., 910 S. Michigan Ave., Chicago, Ill.
Stephens - Adamson Mfg. Co., Aurora, Ill.

ELEVATORS, BUCKET

Jeffrey Mfg. Co., 958 N. Fourth St., Columbus, Ohio.
Link-Belt Co., 910 S. Michigan Ave., Chicago, Ill.
Stephens - Adamson Mfg. Co., Aurora, Ill.

ELEVATOR MACHINERY

Jeffrey Mfg. Co., 958 N. Fourth St., Columbus, Ohio.
Link-Belt Co., 910 S. Michigan Ave., Chicago, Ill.
Stephens - Adamson Mfg. Co., Aurora, Ill.

ELIMINATORS

Nicholson, W. H. & Co., Wilkes-Barre, Pa.

ENGINES

Lidgerwood Mfg. Co., 96 Liberty St., New York City.

ENGINES, GAS AND GASOLINE

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Hendrie & Bolthoff Mfg. & Supply Co., Denver, Colo.
Mine Equipment & Supply Co., Denver, Colo.

ENGINES (Hoisting and Hauling)

Connellsville Mfg. & Mine Supply Co., Connellsville, Pa.
Hendrie & Bolthoff Mfg. & Supply Co., Denver, Colo.
Machinery Warehouse & Sales Co., Old Colony Bldg., Chicago.

ENGINES, OIL

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Hendrie & Bolthoff Mfg. & Supply Co., Denver, Colo.
Mine Equipment & Supply Co., Denver, Colo.
Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.

ENGINES, STEAM

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Hendrie & Bolthoff Mfg. & Supply Co., Denver, Colo.

ENGINEERS

H. R. Ameling Prospecting Co., St. Louis, Mo.
Hunt, Robert & Co., Insurance Exchange, Chicago, Ill.

Indiana Laboratories Co., Hammond, Ind.
Jacobsen & Schraeder, Inc., Marquette Bldg., Chicago, Ill.

Jeffrey Mfg. Co., 958 N. Fourth St., Columbus, Ohio.

Link-Belt Co., 910 S. Michigan Ave., Chicago, Ill.

Longyear, E. J. & Co., Minneapolis, Minn.

Roberts & Schaefer Co., McCormick Bldg., Chicago, Ill.

Wellman-Lewis Co., Hibernian Bldg., Los Angeles, Cal.

EXPANSION JOINTS

The Crane Co., 838 S. Michigan Ave., Chicago, Ill.

EXPLOSIVES

Atlas Powder Co., Wilmington, Del.

Du Pont Powder Co., Wilmington, Del.

Equitable Powder Co., East Alton, Ill.

Hercules Powder Co., Wilmington, Del.

Illinois Powder Co., St. Louis, Mo.

FANS, VENTILATING

Connellsville Mfg. & Mine Supply Co., Connellsville, Pa.

General Electric Co., Schenectady, N. Y.

Hendrie & Bolthoff Mfg. & Supply Co., Denver, Colo.

Jeffrey Mfg. Co., 958 N. Fourth St., Columbus, Ohio.

Vulcan Iron Works, Wilkes-Barre, Pa.

Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.

FEEDERS, ORE

Hendrie & Bolthoff Mfg. & Supply Co., Denver, Colo.

Jeffrey Mfg. Co., 958 N. Fourth St., Columbus, Ohio.

Link-Belt Co., 910 S. Michigan Ave., Chicago, Ill.

Mine & Smelter Supply Co., Denver, Colo.

Stephens - Adamson Mfg. Co., Aurora, Ill.

FILTERS (Water)

Wm. B. Seale & Sons Co., Oakmont, Pa.

FILTER CLOTH (Metallic)

Ludlow-Saylor Wire Co., The, St. Louis, Mo.

FITTINGS (Ground)

Electric Service Supplies Co., 17th and Cambria Sts., Phila., Pa.

FITTINGS PIPE (Malleable and Cast Iron)

The Crane Co., 838 S. Michigan Ave., Chicago, Ill.

FLOTATION OILS

The Barrett Co., 17 Battery Place, New York City.
General Naval Stores Co., 90 West St., New York City.

FORGINGS

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
James H. Channon Mfg. Co., 227 W. Erie St., Chicago, Ill.

Mine Equipment & Supply Co., Denver, Colo.

FORGED STEEL BALLS

Mine Equipment & Supply Co., Denver, Colo.
Mine & Smelter Supply Co., Denver, Colo.

FRAMES

Wellman-Lewis Co., Hibernian Bldg., Los Angeles, Cal.

FRAMES (Head Frames for Mines)

Stupp Bros. Bridge & Iron Co., St. Louis, Mo.

FROGS AND SWITCHES

Central Frog & Switch Co., Cincinnati, Ohio.

FURNACES, MECHANICAL ROASTING

Allis-Chalmers Mfg. Co., Milwaukee, Wis.

GASKETS

Mikesell Bros. Co., 156 N. La Salle St., Chicago, Ill.

GEARS

Electric Service Supplies Co., 17th and Cambria Sts., Phila., Pa.

General Electric Co., Schenectady, N. Y.

Jeffrey Mfg. Co., Columbus, Ohio.

Link-Belt Co., 910 S. Michigan Ave., Chicago, Ill.

Stephens - Adamson Mfg. Co., Aurora, Ill.

Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.

GENERATORS AND GENERATING SETS

Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Hendrie & Bolthoff Mfg. & Supply Co., Denver, Colo.

General Electric Co., Schenectady, N. Y.

Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.

GONGS (Pneumatic Signal)

Electric Service Supplies Co., 17th and Cambria Sts., Phila., Pa.

GREASES

Ohio Grease Co., Loudenville, O.

GRINDING BALLS

Mine Equipment & Supply Co., Denver, Colo.

GUIDES

Frank Prox Co., Terre Haute, Ind.

DINGS



Are successfully handling a large number of complex ores today. We would be interested in testing a sample of your ore. Dings high-tension Magnetic Separators may have an important place on your flow sheet, simplify your process, or give better extraction. Why not investigate the possibility? Write today.

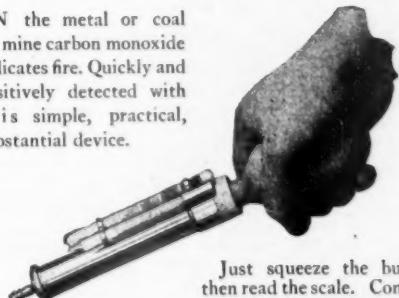
Dings Magnetic Separator Co.

HOME OFFICE AND WORKS
100 Smith Street
Milwaukee, Wisconsin

BRANCHES:
NEW YORK, 52 Vanderbilt Avenue.
DENVER, 1718 California Street.
DETROIT, 18 Columbia Street, West.
RICHMOND, VA., 905 Fourth Avenue.

M-S-A Carbon Monoxide Detector

IN the metal or coal mine carbon monoxide indicates fire. Quickly and positively detected with this simple, practical, substantial device.



Just squeeze the bulb, then read the scale. Comes complete in carrying case with equipment and instructions. Send for folder.

MINE SAFETY APPLIANCES COMPANY

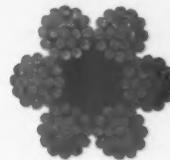
Chamber of Commerce Bldg. Pittsburgh, Pa.

Commerce Bldg., PITTSBURG, KAN.; 808 Post St., SEATTLE, WASH.; 134 N. 13th St., PHILADELPHIA, PA.; 82 Fulton St., NEW YORK; 4236 King St., DENVER, CO.; WILKES-BARRE, PA.; 403 Monongahela Block, CHICAGO, ILL.; 268 Market St., SAN FRANCISCO, CAL.; First Nat. Bank Bldg., BENTON, ILL.; Chamber of Commerce Bldg., LOS ANGELES, CAL.

"Everything for Mine and Industrial Safety."

ROEBLING

WIRE ROPE



*The wire rope of quality and service
1840-1930*

JOHN A. ROEBLING'S SONS CO.

TRENTON, N. J.

ROEBLING



Fight Decay With Carbosota

You're paying two and three prices for your "temporary" structures. If you are not fighting decay with a good wood preservative like Carbosota Creosote Oil, the recognized standard for non-pressure treatments.

For further details address

The *Barrett* Company

New York	Cleveland	Birmingham	Salt Lake City
Milwaukee	Youngstown	Bethlehem	Chicago
Cincinnati	Kansas City	Seattle	Hanover
Toledo	Elizabeth	Philadelphia	Pittsburgh
Minneapolis	Pearl	Washington	Columbus
Buffalo	Boston	Detroit	Dallas
Atlanta	Johnstown	Richmond	Baltimore
St. Louis	New Orleans	Nashville	Duluth
Lebanon	Latrobe	Syracuse	

HANGERS (Insulated Trolley)

Electric Service Supplies Co., 17th and Cambria Sts., Phila., Pa.
Ohio Brass Co., Mansfield, Ohio.

HANGERS (Sanitary Clothes)

James H. Channon Mfg. Co., 227 W. Erie St., Chicago, Ill.

HAULAGE SUPPLIES (Electrical)

Electric Service Supplies Co., 17th and Cambria Sts., Phila., Pa.

HEADLIGHTS, ARC AND INCANDESCENT

Electric Service Supplies Co., 17th and Cambria Sts., Phila., Pa.
General Electric Co., Schenectady, N. Y.
Ohio Brass Co., Mansfield, Ohio.

HIGH INTENSITY MAG-NETS

Dings Magnetic Separator Co., 100 Smith St., Milwaukee, Wis.

HOISTS, ELECTRIC

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Connellsville Mfg. & Mine Supply Co., Connellsville, Pa.
Hendrie & Bolthoff Mfg. & Supply Co., Denver, Colo.
General Electric Co., Schenectady, N. Y.
Lidgerwood Mfg. Co., 96 Liberty St., New York City.
Link-Belt Co., 910 S. Michigan Ave., Chicago, Ill.
Pneumoelectric Machine Co., Syracuse, N. Y.
Roberts & Schaefer Co., McCormick Bldg., Chicago, Ill.
Vulcan Iron Works, Wilkes-Barre, Pa.
Wellman-Seaver Morgan Co., Cleveland, Ohio.

HOISTS, PORTABLE

James H. Channon Mfg. Co., 227 W. Erie St., Chicago, Ill.
Hendrie & Bolthoff Mfg. & Supply Co., Denver, Colo.
Lidgerwood Mfg. Co., 96 Liberty St., New York City.
Link-Belt Co., 910 S. Michigan Ave., Chicago, Ill.
Stephens - Adamson Mfg. Co., Aurora, Ill.

HOISTS, STEAM

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Connellsville Mfg. & Mine Supply Co., Connellsville, Pa.
Hendrie & Bolthoff Mfg. & Supply Co., Denver, Colo.
Lidgerwood Mfg. Co., 96 Liberty St., New York City.
Midwest Steel & Iron Works Co., Denver, Colo.
United Iron Works Co., Kansas City, Mo.
Vulcan Iron Works, Wilkes-Barre, Pa.

HOISTS (Room & Gathering)

Connellsville Mfg. & Mine Supply Co., Connellsville, Pa.
Hendrie & Bolthoff Mfg. & Supply Co., Denver, Colo.
Holmes, Robert & Bros., Inc., Danville, Ill.
Lidgerwood Mfg. Co., 96 Liberty St., New York City.

HOISTING ROPES

Connellsville Mfg. & Mine Supply Co., Connellsville, Pa.
Hendrie & Bolthoff Mfg. & Supply Co., Denver, Colo.

HOSE, AIR

Goodrich Co., The B. F., Akron, Ohio.
United States Rubber Co., New York City.

HOSE (Rubber)

Goodrich Co., The B. F., Akron, Ohio.
United States Rubber Co., New York City.

HYDRAULIC MACHINERY

Allis-Chalmers Mfg. Co., Milwaukee, Wis.

INDUSTRIAL HOUSING

Shouards - McCormick Co., Inc., Terre Haute, Ind.

INSTRUMENTS, SURVEYING

Ainsworth & Sons, Wm., Denver, Colo.

INSULATING MATERIAL, ELECTRIC

Electric Railway Equipment Co., Cincinnati, Ohio.

Electric Service Supplies Co., 17th and Cambria Sts., Phila., Pa.
Hendrie & Bolthoff Mfg. & Supply Co., Denver, Colo.

Mikesell Bros. Co., 156 N. La Salle St., Chicago, Ill.

INSULATING TAPE AND CLOTH

Electric Service Supplies Co., 17th and Cambria Sts., Phila., Pa.
Mikesell Bros. Co., 156 N. La Salle St., Chicago, Ill.

INSULATOR, FEEDER WIRE

Electric Railway Equipment Co., Cincinnati, Ohio.
Ohio Brass Co., Mansfield, Ohio.
Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.

INSULATORS, SECTION

Electric Railway Equipment Co., Cincinnati, Ohio.

Electric Service Supplies Co., 17th and Cambria Sts., Phila., Pa.
Ohio Brass Co., Mansfield, Ohio.
Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.

INSULATORS (Porcelain)

Ohio Brass Co., Mansfield, Ohio.
Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.

INSULATORS (Third Rail)

Electric Service Supplies Co., 17th and Cambria Sts., Phila., Pa.

Ohio Brass Co., Mansfield, Ohio.

INSULATOR'S (Trolley)

Ohio Brass Co., Mansfield, Ohio.

INSULATED WIRE and CABLE

American Steel & Wire Co., Chicago, Ill.
Roebling Sons, John A., Trenton, N. J.

IRON AND STEEL

Stupp Bros. Bridge & Iron Co., St. Louis, Mo.

JACKS

James H. Channon Mfg. Co., 227 W. Erie St., Chicago, Ill.
Electric Service Supplies Co., 17th and Cambria Sts., Phila., Pa.

JIGS

Denver Engineering Works, Denver, Colo.
Link-Belt Co., 910 S. Michigan Ave., Chicago, Ill.

Mine Equipment & Supply Co., Denver, Colo.
Mine & Smelter Supply Co., Denver, Colo.

JOINTS

The Crane Co., 838 S. Michigan Ave., Chicago, Ill.

KILNS (Rotary)

Allis-Chalmers Mfg. Co., Milwaukee, Wis.

KILNS (Rotary Ore Nodulizers)

Allis-Chalmers Mfg. Co., Milwaukee, Wis.

LAMPS, ARC AND INCANDESCENT

General Electric Co., Schenectady, N. Y.
Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.

LAMPS (Carbon)

American Mining Tool Co., Ottumwa, Iowa.
The Sunlight Electrical Mfg. Co., Warren, Ohio.

LAMPS, ELECTRIC

General Electric Co., Schenectady, N. Y.
Hendrie & Bolthoff Mfg. & Supply Co., Denver, Colo.
Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.

LEATHER BELTING

Chicago Belting Co., Chicago, Ill.

LEATHER (Valves, Packings, Specialties)

Chicago Belting Co., Chicago, Ill.

LIGHTNING ARRESTERS

Electric Service Supplies Co., 17th and Cambria Sts., Phila., Pa.

LOADING BOOMS

Connellsville Mfg. & Mine Supply Co., Connellsville, Pa.

Jeffrey Mfg. Co., Columbus, Ohio.
Link-Belt Co., 910 S. Michigan Ave., Chicago, Ill.

Roberts & Schaefer Co., McCormick Bldg., Chicago, Ill.

LOADING MACHINES

Connellsville Mfg. & Mine Supply Co., Connellsville, Pa.

Link-Belt Co., 910 S. Michigan Ave., Chicago, Ill.

LOCOMOTIVE COALING STATIONS

Roberts & Schaefer Co., McCormick Bldg., Chicago, Ill.

Executive Offices:
156 N. La Salle St.
CHICAGO



MIKESELL BROTHERS COMPANY

Manufacturers

Asbestos Textiles

Asbestos and Rubber Packings
Asbestos Cements
Pipe Coverings
Mica

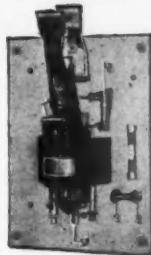
Plant and Works:
WABASH, IND.

Brattice Cloth

PRICES AND SAMPLES CHEERFULLY FURNISHED UPON APPLICATION

AUTOMATIC RECLOSENG CIRCUIT BREAKER

"THE CIRCUIT BREAKER WITH BRAINS"



KNOWS
NOT ONLY WHEN
TO OPEN
BUT ALSO
**WHEN TO
RECLOSE**
AND DOES IT
AUTOMATICALLY

"Let's Get Acquainted"

THE AUTOMATIC RECLOSENG
CIRCUIT BREAKER CO.

COLUMBUS, OHIO

SOLE MANUFACTURERS OF
FULL AUTOMATIC BREAKERS

Coupon Books for Mine Commissaries



The best method of handling sales.
They save time and money—Stop
leaks—Prevent errors—in use for
a quarter century.

For Prices, Samples and
Catalogues, Write

Allison Coupon Company
Indianapolis Indiana, U. S. A.



"Sure Grip" Clamp

To insure uninterrupted
service from your trolley
lines, use

"Elreco"

line material.

Catalog on request



----- 3½ -----

Combination Mine Hanger

ELECTRIC RAILWAY EQUIPMENT CO., Cincinnati, Ohio

LOCOMOTIVES, ELECTRIC

General Electric Co., Schenectady, N. Y.
Goodman Mfg. Co., Chicago, Ill.
Ironton Engine Co., Ironton, O.
Jeffrey Mfg. Co., 958 N. Fourth St., Columbus, Ohio.
Machinery Warehouse & Sales Co., Old Colony Bldg., Chicago.
Mancha Storage Battery Locomotive Co., St. Louis, Mo.
Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.

LOCOMOTIVES, GASOLINE

Ironton Engine Co., Ironton, O.
Machinery Warehouse & Sales Co., Old Colony Bldg., Chicago.
Mine Equipment & Supply Co., Denver, Colo.
Vulcan Iron Works, Wilkes-Barre, Pa.

LOCOMOTIVES, RACK RAIL

Goodman Mfg. Co., Chicago, Ill.
Ironton Engine Co., Ironton, O.
Machinery Warehouse & Sales Co., Old Colony Bldg., Chicago.

LOCOMOTIVES, STEAM

Machinery Warehouse & Sales Co., Old Colony Bldg., Chicago.
Vulcan Iron Works, Wilkes-Barre, Pa.

LOCOMOTIVES, STORAGE BATTERY

General Electric Co., Schenectady, N. Y.
Goodman Mfg. Co., Chicago, Ill.
Hendrie & Bolthoff Mfg. & Supply Co., Denver, Colo.
Ironton Engine Co., Ironton, O.
Machinery Warehouse & Sales Co., Old Colony Bldg., Chicago.
Jeffrey Mfg. Co., 958 N. Fourth St., Columbus, Ohio.
Mancha Storage Battery Locomotive Co., St. Louis, Mo.
Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.

LUBRICATORS

Lunkenheimer Co., The, Cincinnati, Ohio.
Ohio Grease Co., Loudenville, O.

MAGNETIC CONCENTRATORS

Dings Magnetic Separator Co., 100 Smith St., Milwaukee, Wis.

MAGNETIC DRUMS

Dings Magnetic Separator Co., 100 Smith St., Milwaukee, Wis.

MAGNETS (High Intensity)

Dings Magnetic Separator Co., 100 Smith St., Milwaukee, Wis.

MAGNETIC PULLEYS

Dings Magnetic Separator Co., 100 Smith St., Milwaukee, Wis.

MAGNETS (Electro)

Dings Magnetic Separator Co., 100 Smith St., Milwaukee, Wis.

MAGNETS (Standard and Special)

Dings Magnetic Separator Co., 100 Smith St., Milwaukee, Wis.

MATS AND MATTING

Electric Service Supplies Co., 17th and Cambria Sts., Phila., Pa.

MECHANICAL ENGINEERS

Shourds - McCormick Co., Inc., Terre Haute, Ind.

MICA

Mikesell Bros. Co., 156 N. La Salle St., Chicago, Ill.

MILLS, BALL

Mine Equipment & Supply Co., Denver, Colo.

Mine & Smelter Supply Co., Denver, Colo.

MILLS, STAMP

Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Hendrie & Bolthoff Mfg. & Supply Co., Denver, Colo.

Mine Equipment & Supply Co., Denver, Colo.

Wellman-Lewis Co., Hibernian Bldg., Los Angeles, Cal.

MINE COCKS

The Crane Co., 838 S. Michigan Ave., Chicago, Ill.

MINE DOORS, AUTOMATIC

American Mine Door Co., Canton, Ohio.

Dinwiddie Steel & Mfg. Co., St. Louis, Mo.

MINE RESCUE APPARATUS

Mine Safety Appliances Co.

MINING ENGINEERS

Shourds - McCormick Co., Inc., Terre Haute, Ind.

MINING MACHINES

Goodman Mfg. Co., Forty-eighth Place and Halstead St., Chicago, Ill.

MINING MACHINES CHAIN AND PUNCHER

Goodman Mfg. Co., Forty-eighth Place and Halstead St., Chicago, Ill.

Jeffrey Mfg. Co., 958 N. Fourth St., Columbus, Ohio.

MINING MACHINES (Electric)

Goodman Mfg. Co., Chicago, Ill.

Jeffrey Mfg. Co., 958 N. Fourth St., Columbus, Ohio.

Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.

MINING MACHINERY

H. Channon Co., Chicago, Ill.

James H. Channon Mfg. Co., 227 W. Erie St., Chicago, Ill.

Denver Rock Drill Mfg. Co., Denver, Colo.

Dinwiddie Steel & Mfg. Co., St. Louis, Mo.

Hendrie & Bolthoff Mfg. & Supply Co., Denver, Colo.

Machinery Warehouse & Sales Co., Chicago, Ill.

Mine Equipment & Supply Co., Denver, Colo.

Mine & Smelter Supply Co., Denver, Colo.

MINE CAR HITCHINGS

Hockensmith Wheel & Mine Car Co., Penn Station, Pa.

MINE CAR TRUCKS

Hockensmith Wheel & Mine Car Co., Penn Station, Pa.

MINERAL MAGNETIC SEPARATORS

Dings Magnetic Separator Co., 100 Smith St., Milwaukee, Wis.

MINE RESCUE APPARATUS

Siebe, Gorman & Co., Ltd., Monadnock Bldg., Chicago, Ill.

MINE SIGNALS

American Mine Door Co., Canton, Ohio.

Electric Service Supplies Co., 17th and Cambria Sts., Phila., Pa.

MINE SUPPLIES

Electric Service Supplies Co., 17th and Cambria Sts., Phila., Pa.

Hendrie & Bolthoff Mfg. & Supply Co., Denver, Colo.

Mine Equipment & Supply Co., Denver, Colo.

Mine & Smelter Supply Co., Denver, Colo.

MINERS' SUPPLIES

American Mining Tool Co., Ottumwa, Iowa.

MINERS' TOOLS

American Mining Tool Co., Ottumwa, Iowa.

MINING EQUIPMENT

Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Electric Railway Equipment Co., Cincinnati, Ohio.

Electric Service Supplies Co., 17th and Cambria Sts., Phila., Pa.

Hendrie & Bolthoff Mfg. & Supply Co., Denver, Colo.

Mine & Smelter Supply Co., Denver, Colo.

MOTORS

General Electric Co., Schenectady, N. Y.

Goodman Mfg. Co., Chicago, Ill.

Hendrie & Bolthoff Mfg. & Supply Co., Denver, Colo.

Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.

NODULIZERS, ORE

Allis-Chalmers Mfg. Co., Milwaukee, Wis.

OIL AND GREASE CUPS

Lunkenheimer Co., The, Cincinnati, Ohio.

Ohio Grease Co., Loudenville, O.

The Crane Co., 838 S. Michigan Ave., Chicago, Ill.

ORE BUYERS AND SELLERS OF

Illinois Zinc Co., Peru, Ill.

Irvington Smelting & Refining Works, Irvington, N. J.

Phelps-Dodge Corporation, New York City.

ORE CRUSHERS

Hendrie & Bolthoff Mfg. & Supply Co., Denver, Colo.

Mine Equipment & Supply Co., Denver, Colo.

Mine & Smelter Supply Co., Denver, Colo.

ORE FEEDERS

Denver Quartz Mill & Crusher Co., Denver, Colo.

Mine Equipment & Supply Co., Denver, Colo.

Mine & Smelter Supply Co., Denver, Colo.



If you are in need of any pulverizers or crushers for reducing hard and other refractory materials at the lowest upkeep cost and horsepower, write us.

AMERICAN PULVERIZER CO.
St. Louis, Mo.

THE STREETER-AMET WEIGHT RECORDER

Gives an accurate automatic printed weight of each tipple car as it passes over the scale platform.

By substituting this mechanical accuracy for human fallibility the cost of weighing and the chance of errors in tipple weights are both materially reduced.

*Complete descriptive bulletin
on request.*

Streeter - Amet Weighing & Recording Co.

4101 Ravenswood Ave.

Chicago, Ill.



The Right Man in The Right Place

is the cornerstone of every successful mining enterprise. For sixteen years we have secured competent men for mining employers—

Mine and Mill Superintendents, Assayers, Chemists, Engineers, Draftsmen, Metallurgists, Master Mechanics, Accountants.

*Wire or write us regarding
your openings.*



**BUSINESS MEN'S
Clearing House**
Denver, Colo., U.S.A.



NEW YORK

BUFFALO

Bertha Coal Company

General Offices

CHAMBER OF COMMERCE BUILDING
PITTSBURGH

CLEVELAND

DETROIT

ORE SAMPLERS

Hendrie & Bolthoff Mfg. & Supply Co., Denver, Colo.
Indiana Laboratories Co., Hammond, Ind.
Ledoux & Co., Inc., 99 John St., New York.
Lucius Pitkin, Inc., 47 Fulton St., New York.

ORE SEPARATORS

Dings Magnetic Separator Co., 100 Smith St., Milwaukee, Wis.

OXYGEN BREATHING APPARATUS

Mine Safety Appliances Co., Siebe, Gorman & Co., Ltd., Monadnock Bldg., Chicago, Ill.

PACKING

The Crane Co., 838 S. Michigan Ave., Chicago, Ill.

PERFORATED METALS

Chicago Perforating Co., Chicago, Ill.
Laubenstein Mfg. Co., Ashland, Pa.

PERMISSIBLES, Explosives

Atlas Powder Co., Wilmington, Del.
du Pont Powder Co., The E. I., Wilmington, Del.
Equitable Powder Co., East Alton, Ill.
Giant Powder Co., Wilmington, Del.
Hercules Powder Co., Wilmington, Del.
Illinois Powder Co., St. Louis, Mo.

PICKING TABLES

Willis E. Holloway Co., Cleveland, Ohio.
Jeffrey Mfg. Co., 958 N. Fourth St., Columbus, Ohio.
Link-Belt Co., 910 S. Michigan Ave., Chicago, Ill.
Roberts & Schaefer Co., McCormick Bldg., Chicago, Ill.
Stephens - Adamson Mfg. Co., Aurora, Ill.

PIPE BENDS

The Crane Co., 838 S. Michigan Ave., Chicago, Ill.

PIPE, CAST IRON

Hockensmith Mine Car Co., Penn Station, Pa.

PIPE COVERINGS

Mikesell Bros. Co., 156 N. La Salle St., Chicago, Ill.

PIPE (Wood)

Connellsburg Mfg. & Mine Supply Co., Connellsburg, Pa.
Hendrie & Bolthoff Mfg. & Supply Co., Denver, Colo.
Mine & Smelter Supply Co., Denver, Colo.

POWDER, BLASTING

Atlas Powder Co., Wilmington, Del.
du Pont Powder Co., The E. I., Wilmington, Del.
Equitable Powder Co., East Alton, Ill.
Giant Powder Co., Wilmington, Del.
Hercules Powder Co., Wilmington, Del.
Illinois Powder Co., St. Louis, Mo.

POWER SHOVELS

Tew Automatic Shovel Co., Lorain, Ohio.

POWER TRANSMISSION MACHINERY

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Link-Belt Co., 910 S. Michigan Ave., Chicago, Ill.
Stephens - Adamson Mfg. Co., Aurora, Ill.

PROSPECTING DRILLS

Hoffman Bros., Punxsutawney, Pa.
Longyear Co., F. J., Minneapolis, Minn.

PULLEYS (Magnetic)

Dings Magnetic Separator Co., 100 Smith St., Milwaukee, Wis.

PULVERIZERS, COAL AND COKE

American Pulverizer Co., 18th and Austin Sts., St. Louis, Mo.
Jeffrey Mfg. Co., 958 N. Fourth St., Columbus, Ohio.

PUMPS, CENTRIFUGAL

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
United Iron Works Co., Kansas City, Mo.

PUMPS, MILL

The Deming Co., Salem, Ohio.
Hendrie & Bolthoff Mfg. & Supply Co., Denver, Colo.
Mine & Smelter Supply Co., Denver, Colo.

PUMPS, MINE

Connellsburg Mfg. & Mine Supply Co., Connellsburg, Pa.
The Deming Co., Salem, Ohio.
Hendrie & Bolthoff Mfg. & Supply Co., Denver, Colo.
Mine & Smelter Supply Co., Denver, Colo.
United Iron Works, Kansas City, Mo.

PUMPS (Electric)

Connellsburg Mfg. & Mine Supply Co., Connellsburg, Pa.
The Deming Co., Salem, Ohio.

PUMPS (Gathering or Dip)

Connellsburg Mfg. & Mine Supply Co., Connellsburg, Pa.
The Deming Co., Salem, Ohio.
Hendrie & Bolthoff Mfg. & Supply Co., Denver, Colo.

PUMPS, POWER

Connellsburg Mfg. & Mine Supply Co., Connellsburg, Pa.
The Deming Co., Salem, Ohio.
General Electric Co., Schenectady, N. Y.

PUMPS, STEAM

Hendrie & Bolthoff Mfg. & Supply Co., Denver, Colo.

PUMPS, VACUUM

Mine & Smelter Supply Co., Denver, Colo.

RAILS

Buckeye Rolling Mill Co., Steubenville, Ohio.
Machinery Warehouse & Sales Co., Old Colony Bldg., Chicago.

RAIL BONDS

American Steel & Wire Co., Chicago and New York.
Electric Service Supplies Co., 17th and Cambria Sts., Phila., Pa.
General Electric Co., Schenectady, N. Y.
Ohio Brass Co., Mansfield, Ohio.
Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.

RAILWAY SUPPLIES

James H. Channon Mfg. Co., 227 W. Erie St., Chicago, Ill.
Electric Service Supplies Co., 17th and Cambria Sts., Phila., Pa.
Hendrie & Bolthoff Mfg. & Supply Co., Denver, Colo.
Ohio Brass Co., Mansfield, Ohio.

RESPIRATORS

Goodrich Co., The B. F., Akron, Ohio.
Siebe, Gorman & Co., Ltd., Monadnock Bldg., Chicago, Ill.

RAILWAY SUPPLIES

Electric Service Supplies Co., 17th and Cambria Sts., Phila., Pa.

ROCK CRUSHERS

Hendrie & Bolthoff Mfg. & Supply Co., Denver, Colo.
Mine Equipment & Supply Co., Denver, Colo.
Mine & Smelter Supply Co., Denver, Colo.

RECEIVER SEPARATORS

The Crane Co., 838 S. Michigan Ave., Chicago, Ill.

ROCK DRILLS

Denver Rock Drill Mfg. Co., Denver, Colo.

ROLLER BEARINGS

Hyatt Roller Bearing Co., 100 W 41st St., New York, N. Y.

ROLLING MILL MACHINERY

Allis-Chalmers Mfg. Co., Milwaukee, Wis.

ROPE, TRANSMISSION

American Steel & Wire Co., Chicago and New York.

Roebling Sons, John A., Trenton, N. J.

ROPE, WIRE

American Steel & Wire Co., Chicago and New York.
James H. Channon Mfg. Co., 227 W. Erie St., Chicago, Ill.
Hendrie & Bolthoff Mfg. & Supply Co., Denver, Colo.
Roebling Sons, John A., Trenton, N. J.

ROTARY DUMPS

Car-Dumper & Equipment Co., Chicago, Ill.
Link-Belt Co., 910 S. Michigan Ave., Chicago, Ill.

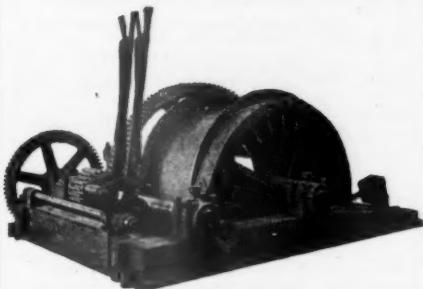
RUBBER GOODS (Hose, Air Drills, etc.)

H. Channon Co., Chicago, Ill.
Hendrie & Bolthoff Mfg. & Supply Co., Denver, Colo.

SAFETY APPLIANCES, MINE

Connellsburg Mfg. & Mine Supply Co., Connellsburg, Pa.
Electric Service Supplies Co., 17th and Cambria Sts., Phila., Pa.
Mine Safety Appliances Co., Siebe, Gorman & Co., Ltd., Monadnock Bldg., Chicago, Ill.

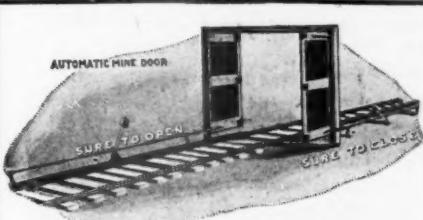
BUILD!



INDUSTRY NEEDS
METALS & COAL

REDUCE HOISTING AND HAULAGE
EXPENSE BY USING

DEWCO ELECTRIC HOISTS
DENVER ENGINEERING WORKS
DENVER, COLO.



AMERICAN MINE DOORS

COMBINE {
SAFETY
ECONOMY
EFFICIENCY}

Has no objectionable features
Sure to please
Can be rented or bought
Rental price saved in a few days
Purchase price saved in a few months
Ask us to send full information. Mention
if Member of Mining Congress

THE AMERICAN MINE DOOR CO.
Canton, Ohio

SOUTHWESTERN ENGINEERING CO.

Incorporated

Engineers and Manufacturers

K & K FLOTATION MACHINE

Efficient, large capacity, relatively less
floor space and power.

HAMIL ORE FEEDERS

Absolutely automatic.

MacCAMY INTERCOOLERS

Will increase the efficiency of your
air compressor.

The above are worthy of investigation.
Let us tell you more. We will
be pleased with the opportunity

FLOTATION and CONCENTRATION ORE TESTING LABORATORY

Los Angeles

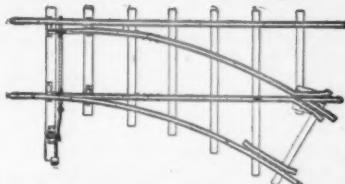
Calif., U. S. A.

THE CENTRAL FROG & SWITCH Co.

CINCINNATI, OHIO

Manufacturers

FROGS-SWITCHES



Crossovers, Crossings, Stands,
Portable Track, Rail Braces
and Track Material of every
description



Prompt Shipment



Write Us

- SAFETY MAGNETS**
- Dings Magnetic Separator Co., 100 Smith St., Milwaukee, Wis.
- SAMPLERS OF ORE**
- Indiana Laboratories Co., Hammond, Ind.
- Ledoux & Co., Inc., 99 John St., New York.
- Lucius Pitkin, Inc., 47 Fulton St., New York City.
- SANDERS (Pneumatic Vacuum)**
- SAW RIGS**
- Electric Service Supplies Co., 17th and Cambria Sts., Phila., Pa.
- Hendrie & Bolthoff Mfg. & Supply Co., Denver, Colo.
- SCALES**
- Standard Scale & Supply Co., The, 1631 Liberty Ave., Pittsburgh, Pa.
- SCREENS**
- Jacobsen & Schraeder, Inc., Marquette Bldg., Chicago, Ill.
- Link-Belt Co., 910 S. Michigan Ave., Chicago, Ill.
- Ludlow-Saylor Wire Co., The, St. Louis, Mo.
- Roberts & Schaefer Co., McCormick Bldg., Chicago, Ill.
- SCREENS (Gravity)**
- Hendrie & Bolthoff Mfg. & Supply Co., Denver, Colo.
- Link-Belt Co., 910 S. Michigan Ave., Chicago, Ill.
- Stephens - Adamson Mfg. Co., Aurora, Ill.
- SCREENS AND PERFORATED SHEETING**
- Allis-Chalmers Mfg. Co., Milwaukee, Wis.
- Chicago Perforating Co., Chicago, Ill.
- Holmes & Brqs., Inc., Robert, Danville, Ill.
- Jeffrey Mfg. Co., 958 N. Fourth St., Columbus, Ohio.
- Link-Belt Co., 910 S. Michigan Ave., Chicago, Ill.
- SCREENS, REVOLVING**
- Chicago Perforating Co., Chicago, Ill.
- Hendrie & Bolthoff Mfg. & Supply Co., Denver, Colo.
- Ludlow-Saylor Wire Co., The, St. Louis, Mo.
- Stephens - Adamson Mfg. Co., Aurora, Ill.
- SCREENS, ROLLED SLOT**
- Ludlow-Saylor Wire Co., The, St. Louis, Mo.
- SEARCHLIGHTS**
- Electric Service Supplies Co., 17th and Cambria Sts., Phila., Pa.
- SEPARATORS (Electro Magnetic)**
- Dings Magnetic Separator Co., 100 Smith St., Milwaukee, Wis.
- SEPARATORS (Magnetic, Wet)**
- Dings Magnetic Separator Co., 100 Smith St., Milwaukee, Wis.
- SEPARATORS (Steam)**
- Hendrie & Bolthoff Mfg. & Supply Co., Denver, Colo.
- Nicholson & Co., W. H., Wilkes-Barre, Pa.
- SEPARATORS (Steam & Oil) STEEL, REINFORCING**
- The Crane Co., 838 S. Michigan Ave., Chicago, Ill.
- SHOVELS**
- Thew Automatic Shovel Co., Lorain, Ohio.
- SHOVELS (Steam, Gas and Electric)**
- Thew Automatic Shovel Co., Lorain, Ohio.
- SIGNS (Enamelled Steel)**
- Electric Service Supplies Co., 17th and Cambria Sts., Phila., Pa.
- SIGNAL SETS**
- Electric Service Supplies Co., 17th and Cambria Sts., Phila., Pa.
- Hendrie & Bolthoff Mfg. & Supply Co., Denver, Colo.
- SINKERS, ROCK DRILL**
- Denver Rock Drill Mfg. Co., Denver, Colo.
- SKIPS**
- Connellsburg Mfg. & Mine Supply Co., Connellsburg, Pa.
- Hendrie & Bolthoff Mfg. & Supply Co., Denver, Colo.
- Roberts & Schaefer Co., McCormick Bldg., Chicago, Ill.
- SMELTTERS**
- Illinois Zinc Co., Peru, Ill.
- Irvington Smelting & Refining Works, Irvington, N. J.
- SPELTER**
- Illinois Zinc Co., Peru, Ill.
- SPLICE, CABLE**
- American Mine Door Co., Canton, Ohio.
- Ohio Brass Co., Mansfield, Ohio.
- SPLICE, INSULATOR**
- American Mine Door Co., Canton, Ohio.
- SPLICE, TROLLEY WIRE**
- American Mine Door Co., Canton, Ohio.
- Electric Railway Equipment Co., Cincinnati, Ohio.
- Ohio Brass Co., Mansfield, Ohio.
- Union Electric Co., Pittsburgh, Pa.
- SPOUTS (Magnetic)**
- Dings Magnetic Separator Co., 100 Smith St., Milwaukee, Wis.
- STEAM SHOVELS**
- Machinery Warehouse & Sales Co., Old Colony Bldg., Chicago.
- Thew Automatic Shovel Co., Lorain, Ohio.
- STEEL BUILDINGS**
- Midwest Steel & Iron Works Co., Denver, Colo.
- Stupp Bros. Bridge & Iron Co., St. Louis, Mo.
- STEEL (Mining)**
- Midwest Steel & Iron Works Co., Denver, Colo.
- Stupp Bros. Bridge & Iron Co., St. Louis, Mo.
- STEEL PLATE WORK**
- Stupp Bros. Bridge & Iron Co., St. Louis, Mo.
- STOPERS, ROCK DRILL**
- Denver Rock Drill Mfg. Co., Denver, Colo.
- STORAGE BATTERIES**
- Edison Storage Battery Co., Orange, N. J.
- STORAGE BATTERIES, LOCOMOTIVES**
- Mancha Storage Locomotive Co., St. Louis, Mo.
- STORES (Company Coupons)**
- Allison Coupon Co., Indianapolis, Ind.
- STRUCTURAL ENGINEERS**
- Shourds - McCormick Co., Inc., Terre Haute, Ind.
- STRUCTURAL STEEL AND IRON**
- Stupp Bros. Steel & Iron Co., St. Louis, Mo.
- Midwest Steel & Iron Works Co., Denver, Colo.
- SURVEYORS**
- Shourds - McCormick Co., Inc., Terre Haute, Ind.
- SWITCHBOARDS, POWER**
- General Electric Co., Schenectady, N. Y.
- Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.
- SWITCHBOARDS, TELEPHONE**
- Allis-Chalmers Mfg. Co., Milwaukee, Wis.
- SWITCHES (Disconnecting and Electric)**
- Electric Service Supplies Co., 17th and Cambria Sts., Phila., Pa.
- SWITCHES, FROGS AND CROSSINGS**
- Central Frog & Switch Co., Cincinnati, Ohio.
- Union Electric Co., Pittsburgh, Pa.
- SWITCHES AND FROGS, TROLLEY**
- American Mine Door Co., Canton, Ohio.
- Electric Railway Equipment Co., Cincinnati, O.
- Ohio Brass Co., Mansfield, Ohio.
- Union Electric Co., Pittsburgh, Pa.
- TANKS (Cylindrical, Acid Storage, Gasoline, Lubricating Oil, etc.)**
- Mine & Smelter Supply Co., Denver, Colo.
- TIPPLES**
- Jacobsen & Schraeder, Inc., Marquette Bldg., Chicago, Ill.
- Link-Belt Co., 910 S. Michigan Ave., Chicago, Ill.
- Roberts & Schaefer Co., McCormick Bldg., Chicago, Ill.

PENNSYLVANIA SMELTING CO.

PITTSBURGH, PA.

WORKS: CARNEGIE, PA.

P. C. C. & St. L. R. R.

PIG LEAD

WE BUY NUGGETS GOLD DUST OR ORES

We have had so many occasions to buy ores, concentrates, amalgam, bullion or nuggets, containing gold, silver or platinum, that we are now purchasing this material in both small and large quantities. Ship them to us, by mail or express. We will send you by return mail the highest market value in spot cash, and will return your goods within ten days if you are not satisfied with the amount we send you. Small shippers given the same prompt, careful attention as large shippers. Nothing is too small or too large for us to handle. We buy anything containing gold, silver or platinum. Bank references.

THE OHIO SMELTING & REFINING CO.
214 LENNOX BLDG. CLEVELAND, OHIO

Wilmot Engineering Company

Hazleton, Pennsylvania

Manufacturers of

Improved Breaker Machinery
for Conveying, Crushing, Sizing
and Cleaning Anthracite Coal

BRATTICE CLOTH

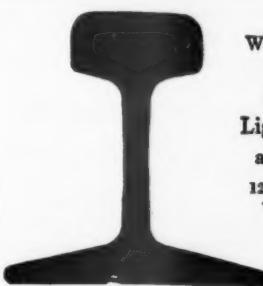
Jute

Duck

Non-inflammable and Waterproof

ELECTRICAL MATERIAL CO.

618 W. Jackson Blvd.
CHICAGO



The
WEST VIRGINIA
RAIL CO.

Manufacturers

Light Steel Rails
and Accessories

12, 16, 20, 25, 30, 35,
40, 45 lbs. per yd.

Mills and General
Offices
Huntington,
W. Va.



WATER

WE-FU-GO AND SCAIFE

PURIFICATION SYSTEMS
SOFTENING & FILTRATION
FOR BOILER FEED AND
ALL INDUSTRIAL USES

WM. B SCAIFE & SONS CO. PITTSBURGH, PA.

CORE DRILLING

H. R. Ameling Prospecting
Company

DIAMOND DRILL
CONTRACTORS

BOATMEN'S BANK BUILDING
ST. LOUIS, MISSOURI

TIPPLE DESIGNERS

Roberts & Schaefer Co., McCormick Bldg., Chicago, Ill.
Shourds-McCormick Co., Inc., Terre Haute, Ind.

TIPPLE EQUIPMENT

Willis E. Holloway Co., Cleveland, Ohio.
Jacobsen & Schaefer, Inc., Marquette Bldg., Chicago, Ill.
Jeffrey Mfg. Co., 958 N. Fourth St., Columbus, Ohio.
Link-Belt Co., 910 S. Michigan Ave., Chicago, Ill.
Roberts & Schaefer Co., McCormick Bldg., Chicago, Ill.
Stephens - Adamson Mfg. Co., Aurora, Ill.

TRACKS, PORTABLE, RAIL, ETC.

Central Frog & Switch Co., Cincinnati, Ohio.
West Virginia Rail Co., Huntington, W. Va.

TRANSFORMERS

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
General Electric Co., Schenectady, N. Y.
Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.

TRAPS

Nicholson & Co., W. H., Wilkes-Barre, Pa.

TROLLEY FROGS

Central Frog & Switch Co., Johnstown, Pa.

TROLLEY (Hangers and Clamps)

Electric Railway Equipment Co., Cincinnati, Ohio.
Ohio Brass Co., Mansfield, Ohio.

TROLLEY MATERIAL, OVERHEAD

James H. Channon Mfg. Co., 227 W. Erie St., Chicago, Ill.
Electric Railway Equipment Co., Cincinnati, Ohio.
Electric Service Supplies Co., 17th and Cambria Sts., Phila., Pa.
General Electric Co., Schenectady, N. Y.
Hendrie & Bolthoff Mfg. & Supply Co., Denver, Colo.
Ohio Brass Co., Mansfield, Ohio.

TROLLEY WHEELS AND HARPS

Electric Railway Equipment Co., Cincinnati, Ohio.

Electric Service Supplies Co., 17th and Cambria Sts., Phila., Pa.
Ohio Brass Co., Mansfield, Ohio.
Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.

TRUCKS

Electric Service Supplies Co., 17th and Cambria Sts., Phila., Pa.

TURBINES, STEAM

Allis-Chalmers Mfg. Co., Milwaukee, Wis.

General Electric Co., Schenectady, N. Y.
Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.

UNIONS

The Crane Co., 838 S. Michigan Ave., Chicago, Ill.

VALVES

The Crane Co., 838 S. Michigan Ave., Chicago, Ill.

Electric Service Supplies Co., 17th and Cambria Sts., Phila., Pa.

Hendrie & Bolthoff Mfg. & Supply Co., Denver, Colo.
Lunkenheimer Co., The, Cincinnati, Ohio.

Ohio Brass Co., Mansfield, Ohio.

VULCANIZED FIBRE

Mikesell Bros. Co., 156 N. LaSalle St., Chicago, Ill.

WAGON LOADERS

Jeffrey Mfg. Co., 958 N. Fourth St., Columbus, Ohio.
Link-Belt Co., 910 S. Michigan Ave., Chicago, Ill.

WASHERS

WASHERIES

Jacobsen & Schaefer, Inc., Marquette Bldg., Chicago, Ill.
Link-Belt Co., 910 S. Michigan Ave., Chicago, Ill.
Roberts & Schaefer Co., McCormick Bldg., Chicago, Ill.

WATER SOFTENING AND PURIFYING APPARATUS

Wm. B. Scalf & Sons Co., Oakmont, Pa.

WEIGHERS

Indiana Laboratories Co., Hammond, Ind.

Ledoux & Co., Inc., New York.
Lucius Pitkin, Inc., 47 Fulton St., New York.

WEIGHTS

Ainsworth, Wm. & Son, Denver, Colo.

WET MAGNETIC SEPARATORS

Dings Magnetic Separator Co., 100 Smith St., Milwaukee, Wis.

WIRE AND CABLE

American Steel & Wire Co., Chicago and New York.

Hendrie & Bolthoff Mfg. & Supply Co., Denver, Colo.

Roebling Sons, The John A. Trenton, N. J.

United States Rubber Co., New York City.

WIRE CLOTH

Ludlow-Saylor Wire Co., The, St. Louis, Mo.

WIRE ROPE

American Steel & Wire Co., Chicago and New York.

WORMS (Worm Wheel and Racks)

Electric Service Supplies Co., 17th and Cambria Sts., Phila., Pa.

ZINC (Rolled Sheets and Strips)

Illinois Zinc Co., Peru, Ill.

SEELEY W. MUDD

Mining Engineer

1208 Hollingsworth Building
Los Angeles, Cal.

Code: Bedford McNeill

W. L. PIERS

ASSAYER AND CHEMIST
RARE METALS AND ANALYSES

428 Eighteenth Street

Denver, Colo.

A. G. FISH, Pres.

CHANGE OF NAME

I. C. BOWER, Sec'y

THE MIDWEST STEEL & IRON WORKS COMPANY

FORMERLY JACKSON-RICHTER IRON WORKS CO.

Largest stock of Steel Beams, Channels, Angles and Plates in the Rocky Mountain Region
32nd AND BLAKE STREETS

DENVER, COLO.

The Indiana Laboratories Co.

Incorporated

Chemists, Assayers, Engineers, Shippers' Representatives

Hammond, Ind.

Philipsburg, Mont.

R. G. READ COMPANY

Engineers and Contractors

Coal Tipplers and Complete Plants for Handling Coal and Coke, Including Steel and Concrete Structures, Designed, Furnished and Erected.

FISHER BUILDING

CHICAGO

W. H. NICHOLSON & CO.

Manufacturers of

Wyoming Automatic Eliminators,
Steam Traps and Steam Separators,
particularly adapted for mine service.

Wilkes-Barre,

Penna.

UNION ASSAY OFFICE, Inc.

Assayers and Chemists

BOX 1446

SALT LAKE CITY

Orvis C. Hoffman

Leon H. Hoffman

DIAMOND CORE DRILLING
—CONTRACTORS—

HOFFMAN BROS.

PUNXSUTAWNEY, PA.
(Our Specialty—Testing Bituminous Coal Lands)
Up-To-Date Equipments. Expert Drill Operators. Inquiries Solicited

SCREENS OF ALL KINDS

Chicago Perforating Co.
3443 West 34th Place
Tel. Coal 1480 CHICAGO, ILL.

BEACH & COMPANY

ORE SAMPLERS AND SHIPPERS AGENTS

Supervise weighing and sampling of ore shipments
to smelters.

Main Office: 204 Boston Bldg., Denver, Col.

JOHN BOYLE, JR.

ATTORNEY-AT-LAW

Patents

B. S. in Mining Engineering and Metallurgy
16 years in the examining corps of the U.S. Patent Office
OURAY BLDG., WASHINGTON, D. C.

WALTER E. BURLINGAME

CHEMIST, ASSAYER AND METALLURGIST

Ore Shippers' Agent Ore Testing
1736 LAWRENCE ST. DENVER, COLORADO
Established 1866

JOHN HERMAN, B.S.C.

SCREENING BALL MILLS

Ore Testing and Assaying

514 S. L. A.

Los Angeles, Cal.

GOODSELL SPECIALTY CO. (Not Inc.)

Brokers and Manufacturers

METALLIC and FIBROUS PACKINGS

MILL and MINE SUPPLIES — BABBITTS

Manufacturers' Agents Expert Advisers

118 NORTH LA SALLE ST., CHICAGO, ILL.

B. W. GOODSELL, Proprietor

QUOTATIONS

ALONZO F. BARDWELL

ASSAYER AND CHEMIST

Ore Shippers' Agent

158 South West Temple St., Salt Lake City, Utah

R. H. OFFICER & COMPANY

ASSAYERS—CHEMISTS

Salt Lake City, Utah Patronage Solicited

To Our Members:

THE VALUE of advertising is measured by the result it produces.

The advertisers in THE MINING CONGRESS JOURNAL are concerns of the highest standing. We, as an organization, are willing to endorse their products.

They have a double purpose in advertising in THE MINING CONGRESS JOURNAL. **First:** They believe that the best results can be obtained by presenting their product directly to the men who purchase equipment. **Second:** They realize that the work being done by The American Mining Congress is important to them as well as to the operator.

Their advertisements are appearing regularly in the JOURNAL. The equipment they produce warrants your investigation if you are in the market for their products. Give them an opportunity to bid upon your requirements.

THE AMERICAN MINING CONGRESS

Deming

MINE PUMPS

For All Mine Pumping Requirements

The Deming Company

Salem

Ohio

BALLS

We make
"DIAMOND" Brand
FORGED STEEL BALLS

for ball mills

If you want the most serviceable
ball made, get in touch with us

THE MINE EQUIPMENT & SUPPLY CO.
Foster Building, Denver, Colo.

At Your Service

If You Have

Business in Washington with any of the government departments, the American Mining Congress will be glad to serve its active members without charge, in any way consistent with its purposes, either in obtaining information, securing public documents, in advising as to the progress of legislation or in the consideration of complaints.

The American Mining Congress is an organization of service. Write us how we may serve you.

The American Mining Congress

Munsey Bldg.

Washington, D. C.

C O A L

American industries are today almost wholly dependent upon the *Coal Mining Industry*.

Perhaps there is no question before the American people which more vitally affects each individual than that of *Coal*.

As a war necessity Congress nationalized our *transportation system*. The result is a deficit that is appalling, and is one which means dollars in taxation to the people of the country.

*There are a few who would nationalize our coal mines.
These few are busy spreading their propaganda.*

The great mass of American people is guided in its thinking by the genius who attracts their eyes with statements that are extravagant and founded but on half a truth.

They do not stop to analyze these facts:

Coal is the essential in modern industrial life.

Coal is the basic American industry.

Coal is the basis of 1500 branches of industry.

National control necessarily means political control.

If the coal mines are nationalized the bolshevist element could completely demoralize these 1500 American industries, with their strike system, and the great unprotected public would be at the mercy of the few who are in power.

The American Mining Congress

is alive to the great questions that are today facing coal operators. Are you familiar with its position upon this vital subject? Do you know what it is doing to help meet the situation?

ADDRESS:

Washington Headquarters, Munsey Building

For Information

Thorne, Neale & Company

(Incorporated)

FRANKLIN BANK BUILDING

1416 CHESTNUT STREET (9.00 A. M.-4.00 P. M.)
PHILADELPHIA, PA.

Miners' Agents and Wholesale Dealers

ANTHRACITE and BITUMINOUS C O A L

Shipments via all Railroads, All Piers

New York Office: No. 17 Battery Place

Branch Offices:

Baltimore

Chicago

Mauch Chunk, Pa.

Buffalo

Altoona, Pa.

THE LEHIGH COAL AND NAVIGATION COMPANY

MINERS OF



ANTHRACITE COAL

“The Best Since 1820”

437 CHESTNUT STREET
PHILADELPHIA, PENNSYLVANIA

LEDOUX & COMPANY, Inc.

NEW YORK

Sample and Assay Ores and Metals

Having representatives at buyers' works we receive, weigh, sample and assay consignments representing the sellers in all transactions. We are not dealers or refiners.

Laboratory and Office: 99 John Street

Phelps Dodge Corporation

99 JOHN STREET
NEW YORK

COPPER

"C * Q"
ELECTROLYTIC

"P. D. Co."
CASTING

ILLINOIS ZINC COMPANY PERU, ILLINOIS

Manufacturers of

Selected Brass SPELTER, Sulphuric Acid
Rollers of ZINC in SHEETS
PLATES and STRIPS

Special sizes of zinc cut to order in squares
and circles, battery plates, etchers', engravers'
and lithographers' plates. Paper and
card makers' sheets.

W. Fisher, Eastern Sales Agent
203 Broadway
Tel. Cortland 1981

NEW YORK

HAMILTON, BEAUCHAMP, WOODWORTH, Inc.

METALLURGICAL ENGINEERS

SPECIALTY: THE TREATMENT OF GOLD AND
SILVER ORES, BY FLOTATION, BY CYANIDE,
OR BY A COMBINATION OF BOTH PROCESSES

Flotation of Copper, Lead, Zinc, and Other
Minerals

Tests made on Lots of 1 lb. up to 5 Tons

MILLS DESIGNED AND CONSTRUCTED, CONSULTING AND EXPERT WORK UNDERTAKEN
Laboratory and Office: 419 The Embarcadero, San Francisco

Telephone: Sutter 5266 Cable Address: Hambeau
Codes: West. Union; Bed. McNeill

Robert W. Hunt
Jas. C. Hallsted

Jno. J. Cone
D. W. McNaugher

ROBERT W. HUNT & CO. Engineers

Bureau of Inspection, Tests and Consultation
2200 Insurance Exchange,
Chicago

Mining Engineers and Chemists
Inspection Construction Materials and
Machinery at Point of Manufacture.

E. J. LONGYEAR COMPANY

Exploring Engineers

Diamond Drill Contractors and
Manufacturers

Examination

Exploration
and Development
of
Mineral Lands

MINNEAPOLIS MINNESOTA

Irvington Smelting and Refining Works

*Buyers, Smelters and Refiners of
Gold, Silver, Lead, Copper and Platinum
Ores, Sweeps and Bullion*

Manufacturers of Copper Sulphate

IRVINGTON :: :: NEW JERSEY

N. Y. OFFICE—Charles Engelhard
Hudson Terminal Building 30 Church Street

Janney FLOTATION MACHINES

are made in two sizes: The "Little" Janney for mills treating up to 100 tons of ore per day, and the "Standard" for mills treating 100 tons or more per day. They get the last possible pound of mineral and produce a high grade concentrate.

Both are adaptable to treatment of all ores amenable to flotation.

The Janney patented circulating feature has a similar effect upon flotation to that obtained by having a screened or classified circulating load through any crushing medium.

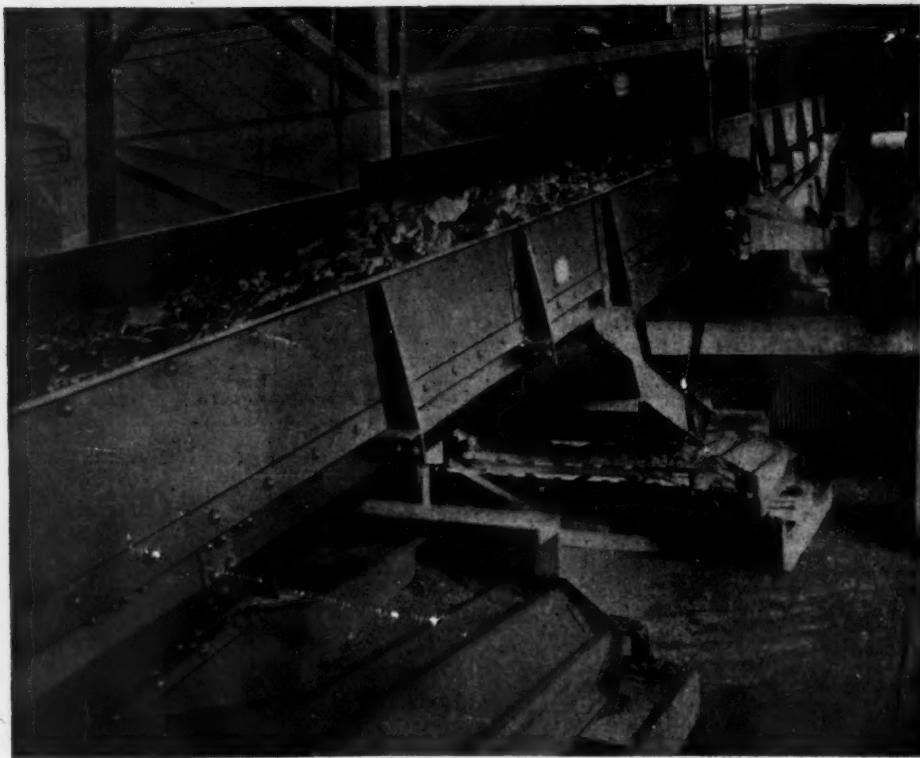
We make a specialty of testing ores by flotation. Send for illustrated booklets.

Manufactured and Sold Exclusively by
STIMPSON EQUIPMENT CO.
Felt Building, Salt Lake City, Utah

INDEX TO ADVERTISERS

Page		Page	
Allison Coupon Co.	51	Koppers Company, The	8
Allis-Chalmers Manufacturing Co.	27-32	Lalor Company, W. M.	43
American Cyanamid Co.	4	Ledoux & Co.	64
Ameling Prospecting Co., H. R.	57	Lehigh Coal & Navigation Co., The	63
American Hard Rubber Co.	30	Leschen & Sons Rope Company, A.	19
American Mine Door Co.	55	Lidgerwood Manufacturing Co.	23
American Pulverizer Co.	53	Link-Belt Company	66
American Steel & Wire Co.	24	Longyear & Co., E. J.	64
Anaconda Copper Mining Co.	22	Ludlow-Saylor Wire Co., The	28
Automatic Reclosing Circuit Breaker Co.	51	Lunkenheimer Company, The	57
Atlas Car & Manufacturing Co.	16	Mancha Storage Battery Locomotive Co.	29
Atlas Powder Co.	37	Mikesell Bros. Company	51
Bardwell, Alonzo F.	39	Mine Equipment & Supply Co.	61
Barrett Company, The	49	Mine Safety Appliances Co.	49
Beach & Co.	59	Morse Chain Co.	10
Bertha Coal Co.	53	Mudd, Seely W.	58
Boyle, Jr., John	59	Myers-Whaley Company	31
Burlingame, Walter E.	59	National Fuse & Powder Co.	26
Business Men's Clearing House	53	Nicholson & Co., W. H.	59
Car Dumper & Equipment Co.	29	New York Engineering Co.	20
Central Frog & Switch Co.	55	Nordberg Manufacturing Co.	11
Channon Manufacturing Co., James H.	28	Officer & Co., R. H.	59
Chicago Belting Co.	Cover	Ohio Brass Co.	47
Chicago Perforating Co.	59	Ohio Smelting & Refining Co., The	57
Connellsville Mfg. & Mine Supply Co.	47	Ottumwa Box Car Loader Co.	33
Deister Concentrator Co., The	45	Oxweld Acetylene Co.	41
Deming Company, The	61	Pennsylvania Smelting Co., The	57
Denver Engineering Works Co.	55	Phelps Dodge Corporation	64
Denver Rock Drill Manufacturing Co.	21	Piers, W. L.	58
Dings Magnetic Separator Co.	49	Pneumatic Electric Machine Co.	25
Dinwiddie Steel & Manufacturing Co.	19	Prox Company, Frank	45
Edison Storage Battery Co.	Cover	Read Company, R. G.	59
Electrical Material Co.	57	Roberts & Schaefer Co.	27
Electric Railway Equipment Co.	51	Roebling's Sons Company, John A.	49
Federal Sign System (Electric)	8	Roessler & Hasslacher Chemical Co.	34
General Briquetting Co.	45	Scaife & Sons Co., William B.	57
General Electric Co.	14	Shourds-Stoner Company	26
General Naval Stores Co.	24	Southwestern Engineering Co.	55
Goodman Manufacturing Co.	28	Standard Oil Co.	29
Goodrich Rubber Co., The B. F.	17	Stephens-Adamson Manufacturing Co.	40
Goodsell Specialty Co.	59	Stimpson Equipment Co.	64
Grassell Chemical Co.	36	Streeter-Amet Weighing & Recording Co.	33
Hamilton, Beauchamp, Woodworth	64	Thompson Balance Co.	45
Hercules Powder Co.	35	Thorne, Neale & Co.	63
Herman, John	59	Union Assay Office	59
Hoffman Bros.	59	Union Electric Co.	43
Hockensmith Wheel & Mine Car Co.	43	United Filters Corporation	47
Holmes & Bros., Robert	25	United Iron Works Co.	45
Hunt & Co., Robert W.	64	United Metals Selling Co.	22
Hyatt Roller Bearing Co.	7	United States Rubber Co.	3
Illinois Powder Manufacturing Co.	26	Vulcan Iron Works	9
Illinois Zinc Co.	64	Watt Mining Car Wheel Co.	23
Indiana Laboratories Co.	59	Wellman-Lewis Company	47
Ingersoll-Rand Company	12	Wellman-Seaver-Morgan Company	39
Ironton Engine Co.	16	Westinghouse Electric & Mfg. Co.	13
Irvinton Smelting & Refining Works	64	West Virginia Rail Co.	57
Jacobsen & Schraeder, Inc.	21	Wilmet Engineering Co.	57
Jeffrey Manufacturing Co., The	Cover	Worthington Pump & Machinery Corp.	15

The Effective Preparation of Coal



A Link-Belt West Virginia Installation. Shaking Screen and Picking Tables.

IN these days of under-production, labor shortage and almost unprecedented demand for coal, Link-Belt complete equipment for the handling and preparation of coal at the mine is rendering an indispensable service to the operators and manufacturers of the country.

Under these conditions, Link-Belt design, high quality and fitness for the work performed, are being demonstrated. Link-Belt equipment plays a big part in the entire process of coal preparation, from mine-mouth to cars, conveying, screening, separating, washing, load-

ing; running smoothly, perfectly, at full capacity and without let-up.

Our engineers will be glad of the opportunity to assist you to increase production and reduce labor costs with Link-Belt Equipment. Send for Catalog No. 333.

5-87

PHILADELPHIA

New York
Boston
Pittsburgh
St. Louis
Buffalo
Wilkes-Barre
Huntington, W. Va.
Cleveland
Detroit

CHICAGO

Birmingham, Ala.

LINK-BELT COMPANY

299 Broadway
49 Federal St.
1501 Park Bldg.
Central Nat'l Bank Bldg.
547 Elliott Square
Nat'l Bank Bldg.
Robt. Prindl Bldg.
429 Kirby Bldg.
700 Woodward Ave.

KANSAS CITY, Mo.

Seattle
Portland, Ore.
San Francisco
Los Angeles
Toronto, Can.
Denver
Louisville, Ky.
New Orleans

INDIANAPOLIS

306 Elmhurst Bldg.
820 First Ave.
First and Stark Sts.
168 Second St.
163 N. Los Angeles St.
Canadian Link-Belt Co., Ltd.
Lindrooth, Shurett Co., Boston Bldg.
F. Wehle, Starks Bldg.
S. L. Morrow, 720 Brown-Marx Bldg.

TORONTO

306 Elmhurst Bldg.
820 First Ave.
First and Stark Sts.
168 Second St.
163 N. Los Angeles St.
Canadian Link-Belt Co., Ltd.
Lindrooth, Shurett Co., Boston Bldg.
F. Wehle, Starks Bldg.
C. O. Hinz, Hibernia Bank Bldg.

LINK-BELT

COAL HANDLING MACHINERY



Leather Sense™ Plus-Honesty



BY INVITATION
MEMBER OF
INTERNATIONAL
BROTHERHOOD
OF TEAMSTERS,
CHAUFFEURS,
GARAGE WORKERS
AND HELPERS
NEW YORK, U.S.A.

"LEATHER SENSE" is that rare quality possessed by some few men in the leather business, that includes judgment, training, and experience, and goes beyond them. No amount of training or experience can give you "leather sense". You either acquire it or you don't, and few have it.

The man has it who is shown inspecting the leather before the center stock is cut out for our Reliance and Sea Lion belting. He not only has "leather sense" but he had eleven years training as a belt maker before he was entrusted with this important work. And when we add to judgment, training, experience, and "leather sense", the inherent honesty of character which is a fundamental requirement of all of our workmen, we know that one more responsibility has been well placed.

Leather belting is peculiarly a product in which the capability and honesty of the men who make and market the belts are all important factors in the finished result. These qualities are basic possessions of the entire personnel of both our manufacturing and sales departments. They are the main reason why Chicago Belting is now regarded as the standard of quality in the field of power transmission by belting.

Chicago Belting Company

Manufacturers of Leather Belting

NEW YORK
PITTSBURGH
CLEVELAND
ROCKFORD
MILWAUKEE

102 NORTH GREEN STREET
CHICAGO, U.S.A.

NEW ORLEANS
LOS ANGELES
SAN FRANCISCO
PORTLAND, ORE.
SEATTLE, WASH.

Write for our new
96 page Belting Reference
Book and Catalog.

Chicago Belting



(Licensed under the patents of E. C. Morgan)

The **Jeffrey** 34-B Entry Driver

*Insures Quick Returns from
Investment in Opening a Mine*

A property that with the present system takes years to develop can be opened up in a short time by the use of these mining machines. As soon as overhead equipment is in, it is simply a question of putting in a sufficient number of machines to obtain a desired outfit, as work can be concentrated and output obtained from a small territory.

Constantly increasing Cost of Coal Land Demands the Maximum Recovery of Coal—and the way to insure this maximum recovery is to drive entries to the boundary line and retreat.

The Jeffrey 34-B Machine will, under fair conditions, drive entries about five or six times as fast as is ordinarily done.

*Write for our new Catalog No. 269-H illustrating and
describing the Jeffrey 34-B Entry Driver*

The Jeffrey Mfg. Co., 958 North 4th Street, Columbus, Ohio

BRANCHES:

New York	Boston	Charleston, W. Va.	Detroit	Philadelphia	Scranton	Pittsburgh
Chicago	St. Louis	Dallas	Buffalo	Cleveland	Birmingham	Montreal

Denver Office: First National Bank Building

Los Angeles: Herman W. Hellman Building

